

## Independent People's Tribunal on



# Dams, Environment & Displacement

### Panel

Justice K K Usha (Retd.), Chief Justice of Kerala High Court

Gayatri Singh, Senior Advocate, Mumbai High Court

Ravindra Nath, Environmental Activist from Gauwhati

Arnab Bhattacharya, Eminent Activist from Siliguri West Bengal

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**HRLN**

Human Rights Law Network, India

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**Dr. Doma T. Bhutia**

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IPT on Dams, Environment and Displacement

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## ABOUT THE INDEPENDENT PEOPLE'S TRIBUNAL ON DAMS, ENVIRONMENT AND DISPLACEMENT

Rivers are an integral part of the Sikkimese ethos. Much of the folklore and traditions of the locals revolve around the mighty Teesta and the Rangeet Rivers. The River Teesta not only sustains the livelihood of the locals by preserving and propagating the rich bio-diversity, but also is the very backbone of Sikkim's cultural heritage. The river's source in the North is regarded by the Lepchas as holy and the "cradle of their civilisation." It is home to diverse ecological systems inhabited by rich and diverse flora and fauna and many protected species of plants and animals.

Sadly, development to this small state has come in a diabolic way in the form of hydropower projects to be built on the Teesta and Rangeet Rivers. More than 20 mega hydropower projects have been proposed challenging the need, benefits and the rights of the people. There is colossal environmental damage to the entire region as well as to the mighty river which is being turned into a paltry stream. The planners have no idea about the fatality and futility of the entire project. The social, cultural and livelihood hazards posed by the project have also been totally ignored leaving the affected people at the mercy of the private companies and vested interests. The manner in which the lands have been acquired from the people and the displacement has been carried out of the local communities also raises questions vis-a-vis the rights of the people over their lands. In the name of development, forest and private lands are acquired for private companies/corporates under threat, coercion, and people are forced to accept petty compensation in the name of public purpose. The fear psychosis remains prevalent in the region.

A group of resolute Lepchas, Lachenpas civil society groups and local people have been resisting the mindless construction of the dams. They

consider it as a threat not only to the environment, but also to their traditions, culture and livelihood. They fear that the river's disappearance into a series of tunnels will be accompanied by their own marginalisation in the long run. Sadly, the protesting groups have faced threats and intimidation from all quarters, turning their resistance into a David- Goliath duel where they have everything to lose.

It is against this background that an Independent People's Tribunal was held to conduct a fair and credible hearing, and provide a voice to the struggles of the grassroots groups and the affected people. The affected people from the Eastern, Western and Northern districts of Sikkim came together to raise their voices and provide testimonies on the daily toils suffered due to the construction of dams in the state. Taking their stories The Independent People's Tribunal on Dams, displacement & Environment, organised by the Human Right Law Network detailed accounts of the devastating impact of dam construction shared by the affected farmers and labourers. The community activists spoke on a range of pressing issues, covering drought, destruction and denials of participation and livelihood due to dam construction. Many a participant questioned the intended beneficiaries of the dams, as testimonies noted the disproportionate output of energy projected by the dams (5,000 megawatt) a year, considering Sikkim's yearly energy requirement of 80MW. Poignant comments were made like for whom energy was intended. Testimonies highlighted failures by the government to conduct public hearings in a proper manner. Farmers from Singbel, East Sikkim, espoused violation of their basic rights to be heard, as no public hearings were conducted prior to dam construction. The deponents viewed such violations as an affront to democracy and contrary to legal obligations. Farmers from Darap, West Sikkim spoke of improper hearing organised by the District Collector, with a promise to hold a hearing again but did not happen. Communities from Upper Dzongu, North Sikkim shared stories of voicing objection to dam's development and being arrested on account of expressing such objections. Detailed accounts of the devastating impact of tunnel construction were also presented. People are also affected by underground tunnel construction, but there is no compensation for such losses. There is no compensation because such construction does not constitute an acquisition of their land. The farmers also faced water crisis, with construction of dams causing severe drought, adversely affecting access to safe drink-

ing water and crop yields. The farmers were also coerced to opt for other vocations. The houses in the villages were also damaged due to severe vibrations during construction in the tunnels causing cracks in the walls, ceilings and floors as per the report of the State Department of Mines & Geology. The place most affected due to the recent earthquake is North Sikkim. This virtually led to loss of the people's life and properties.

The Independent People's Tribunal gave opportunity to the departments concerned to respond to critical grievances raised by the farmers. The departments concerned like Forest Department, concerned power developers like Teesta Urja, NHPC and Secretaries of Home and Land Revenue Departments did not bother to respond to the queries raised by the affected people.

Therefore, the findings of this IPT will reflect the real picture at the grassroots. It is envisioned that the IPT will serve the dual purpose of understanding and investigating the dissent against the dams.

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# UNHEARD VOICES FROM THE RIVER BANK OF SIKKIM

## 1.1 Background and introduction

The state of Sikkim is seen as the future power-house of India at the cost of people of Sikkim as viewed by the local activists. And the justification given for proposing more than 20 dams in the tiny Himalayan state is that it would generate revenue for the state, create employment for the unemployed youth. The argument being that the direct displacement of indigenous people is not significant. This ostensibly win-win situation has, in fact, proven to be a myth and the common resources of the people like forests, cultivable agricultural lands and water are now in the sole custody of the rich and well-heeled. This so-called “development” has had a huge detrimental impact on the environment and has resulted in gross violation of human rights as the Teesta River, Rangeet River and other streams are a common property resource of the people.

The mega hydel power projects cover a significant proportion of forest and private lands. Sikkim is still primarily an agrarian state. Eighty percent of the population, directly or indirectly, depends on the natural resources of the state. Land is very scarce even as only twelve percent of the area is inhabited by the people of Sikkim. The rest is reserved/protected forest land. Hence, there has been much resistance from the people of the north district of Sikkim. People have not been allowed to express their views in the matter. This has resulted in the violation of basic democratic rights as provided by Articles 14, 19 and 21 of the Constitution. Sikkim was admitted to the Indian Union in 1975 with the assurance that its culture, heritage and environment would be preserved under article 371F of the Constitution.

“The state government identified 35 hydro-power projects with an aggregate installed capacity of 5,741.20MW and invited the Independent Power Producers (IPPs) for development of projects since 2001-02. Per-

formance audit of development of hydro-power projects by the state Government through private sector participation revealed that the state had neither finalised its hydro-power policy, nor prepared a time-bound plan till date for implementation of the projects. Absence of a firm and defined policy and a definite plan led to inconsistency in the award of projects and lack of a well-thought of revenue model resulted in loss of potential revenue. Besides, the state also did not take sufficient precaution against degradation of environment.” (CAG Report 2009)

“Following the liberalisation of power policy by the GOI, the state government has also opened the power sector to private developers with the objective of rapidly harnessing the hydro-power potential of the state and thereby gaining in a big way by exporting electricity to other power hungry states of the country. The hydro-power potential of the state was assessed at 8,000 MW peak.” (CAG Report 2009)

“The total hydro-power potential of Sikkim as assessed by Central Water Commission, GOI, is around 8,000 MW, out of which around 2,000 MW is in the micro, mini and small hydro categories. Remaining 6,000 MW would fall either in the small or mega size hydro scheme.” (Energy & Power Sector Vision 2015).

In 2011, two projects – 510 MW Teesta Stage-V HEP and 60 MW Rangeet-III HEP – have been commissioned by the NHPC and are generating power. The construction work of five projects under the IPPs is in full swing and the pre-construction work of another five projects under the private sector has been started. The remaining thirteen projects are in different stages of getting all the statutory clearances from the authorities and, according to the Energy & Power Department, Government of Sikkim, are expected to be commissioned by 2017.

“With the aim of achieving total targeted capacity of 5,000 MW by the year 2015, the Energy & Power Department/SPDCL has so far allotted 25 hydroelectric power projects with a total installed capacity of 5,284 MW to various IPPs, including NHPC. Apart from these projects, SPDCL shall also be taking up some more new projects (around 250-300 MW) under joint venture with the selected strategic partner.” (Energy & Power Sector Vision 2015)

According to the 17<sup>th</sup> Power Survey of India, the peak energy demand in the state is around 83 MW in 2011-12 and in ten years it is expected to

be no more than 150 MW (see Annexure III).

In particular, the project has proceeded without considering the various antecedent conditions necessary as an essential prerequisite to such a project.

Further vide Notification No.3069/O.S. dated 24 March 1958 issued by the Home Department, Government of Sikkim, declared that there was a prohibition on anyone other than the indigenous people of the North Districts to carry on with any occupation without a permit in the restricted area of North Sikkim. The lack of a permit can entail a punishment of upto three years and this includes people who are aiding or abetting. Furthermore, by another Notification of Sikkim Gazette September, 1958, -Part-III Rules, the state of Sikkim has ordered that trade and business is not allowed for non-indigenous people. Therefore, Article 371-F (k) of the Indian Constitution gives special protection to the rights of the Sikkimese and upholds the old, pre-accession laws of the state. Since Dzongu, North district, has been declared a "protected area" by the erstwhile king of Sikkim, its special status is upheld by the Constitution. The said Dzongu Protected Area also falls within the restricted area of Kanchendzonga Biosphere Reserve Area, but the construction activities of the project are being allowed in this protected area.

Fact finding research tells us that this "development" has heaped nothing but misery upon the lives of farmers. Most farmers have faced threats and intimidation by the government. They have been told that the government can acquire their lands without their consent, perhaps in the name of larger public purpose. Most have been coerced into accepting minimalist compensatory amounts of money in lieu of precious ancestral lands. 'Development' has been imposed upon them in complete violation of the environment protection legislation. This has left farmers helpless and without a say in the matter. Most of them have been left with no choice but to take up employment as unskilled workers at the lowest level and become labourers on their own lands through sub-contractors without proper appointment letters. The farmers who are not employees of any company and are appointed directly by sub-contractors are given salaries not at par with those employed with power developers. The ground reality is that countless villagers end up losing employment due to pressure tactics adopted by power-developers on one pretext or the others, and the government only has false promises of a better future. These farmers have



lost their identity and the roots.

The continuous blasting of mountains to make tunnels has caused cracks on people's homes. During lean seasons most river streams are diverted towards tunnels only to worsen the plight of the villagers.

The state government kept insisting that the construction of dams would help generate better employment prospects. We need to look into what kind of employment opportunities are being generated. Also, there is no policy in place in terms of protection of workers – local or migrant. And even the Central Act – that is the Industrial Disputes Act, 1947 – has not been extended, notified or implemented whereas a draconian Act like the Land Acquisition Act 1894 has been widely implemented to acquire agricultural lands from farmers at throw-away prices. Workers have no access to justice as there is not a single labour court. The Labour Commissioner's office is closed most of the time, because he is handling many portfolios and is on tour most of the time. Sikkim State Labour Act does not have any comprehensive provision to deal with the situation of the workers and the issue of their protection.

## 1.2 Development versus displacement

Analysis shows that the costs of these projects often outweigh the possible benefits they bring to the society. Often the victims are the poorest and the most marginalised communities in society. Impoverishment and disempowerment often become their lot, with particularly harsh consequences for women and children. According to sociologist Michael Cernea, "The onset of impoverishment can be presented through a model of eight inter-linked potential risks intrinsic to displacement. These are landlessness, joblessness, homelessness, marginalisation, increased morbidity, food insecurity, loss of access to common property and the umbrella process of social disintegration."

The environment activist who raises a voice against dams or displacement is tagged by the government as anti-development or anti-national across the country and the process of development of large project remains in the hands of a small group of people, at the expense of those who lose their lands and sources of livelihood. And more than that the uprooting of farmers from their lands leading to displacement, unsafe migration and children becoming vulnerable to illegal trafficking for child labour,

domestic help and forced prostitution and are pushed even further to the margins of the society. In this process, the human rights of huge masses of people, especially the poor, are violated mercilessly.

The process of conducting the studies did not involve the affected people. Of the 26 projects, for which letters of intent have been issued, 24 are given to first-time private developers having no experience of such work. The path of development chosen by the state government is in the highly fragile ecologically sensitive and earthquake prone zone-V of tiny Himalayan region. As it is evident the man-made disaster, in the name of development, leads to climate change and environment pollution, frequent landslides, floods, untimely snowfalls etc. There are fundamental issues that are directly related to landslides and displacement. In the coming years state of Sikkim will face great challenges.

Another pertinent point to be noted is that project areas are strategically important as they are on the border area that share its boundary with China controlled Tibet. Therefore, in terms of security as well as in terms of protecting the rich natural resources, viz bio-diversity, the North district is a restricted and protected village largely inhabited by the tribal people i.e. Lepcha and Bhutia. Hence, the areas are declared by the Maharaja vide "Proclamation" dated 30 August, 1956 "Restricted Area" and even the local people from other districts, viz East, West & South are required inner-line permit to enter the North District of Sikkim.

### **1.3. People's resistance**

In the State of Sikkim, since 1990s people have been protesting against hydel projects. The most noteworthy movement took place against the Rathongchu Hydel Power Projects in 1990. This is because, unlike anywhere else in the world, it was pioneered by monks and religious and spiritual leaders who raised voice to protest against dams on the grounds that the religious and cultural aspects of life in Sikkim were being violated.

People, from various parts of North Sikkim, protested against the said dams in a peaceful manner. The ACT youth organisation and its members – from Dzongu, North Sikkim sat on a fast unto death for nine hundred and fifteen days (915) to protest against the construction of the Hydel Power Projects in North Sikkim. This area of North Sikkim was, in fact the epi-centre of the recent earthquake of 18 September 2011.

Till date, it is the tribal people who have been protecting the forests with their indigenous knowledge. For the tribal people, the River Teesta is holy. They worship the river, the Himalaya and wild animals. The largest hydel power project which is the 1200MW Teesta stage-III is under construction at Chungthang, North Sikkim is also one of the areas adversely affected during the earthquake on 18 September 2011.

These hydel projects have contributed nothing but water pollution, noise pollution, destruction of adjoining forests, tunneling and blasting of the mountains, subsequently affecting the environment, ecology and biodiversity, thereby turning the village of Chungthang almost into a graveyard. The people of North Sikkim, the Lachenpas are against the diversion of protected forest lands, because their survival depends on nature and they worship the nature as their protecting deity for religious sentiments, too.

The Khangdzonga National Park [KNP] is a huge asset to the ecological conserve of India and is of great national importance. It embraces the gigantic Zemu glacier in its periphery and is sprawled across 850sq km and is also known to be the largest wildlife reserve in Sikkim. This biosphere reserved forest is in an environmentally/ecologically fragile protected zone and the state government, in the name of development, is exploiting natural resources to generate more revenue. And the pertinent point is that the whole state of Sikkim falls under seismic, zone-V. The 18 September 2011 earthquake of 6.9 richter scale proves the fact. Hence, the entire project areas, and their periphery, are ecologically sensitive and fragile. The mountains are young with highly folded and faulted rock strata. Major portion is covered by the very young pre-Cambrian rocks. The rock type consists of phyllites and schist and, therefore, the slopes are highly susceptible to weathering and prone to soil-erosion and landslides according to a report by the Forest Department, Government of Sikkim in their *Magazine Newsletter* 2009 Volume-II No.1.

Due to global warming, most of the glaciers are receding which is likely to result in greater environmental hazards and, therefore, these areas are not suitable for development of any Mega Hydel Power Projects. In the name of so-called "development," common resources of people such as water, land and forests are routinely exploited by the government leading to a virtual degradation of the environment. People have already suffered major damages due to tunnel excavations at Teesta Stage-V of East Sikkim

and Stage-III at Chungthang, North Sikkim, as reported by the Mines, Minerals and Geology Department, Government of Sikkim. The disproportionate construction of large number of hydel power projects in a tiny Himalayan state has created unsustainable pressure on environment as it has led to spiralling pollution, landslides and drying of water sources, thereby leading to food insecurity. Despite these circumstances more often than not, people's resistance is being irredeemably compromised.

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After construction of Dam



After under construction of Dam of North Sikkim



Affected Chungthang village



Affected Chungthang village



Chungthang Teesta Stage-III HEP



North Sikkim before construction of Dams

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## GLOSSARY

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CA	Compensatory Afforestation
CAG	The Comptroller and Auditor General of India
CAT	Catchment Area Treatment
CEA	Central Electricity Authority
DC	District Collector
DPR	Detailed Project Report
EAC	Expert Appraisal Committee on River Valley and Hydroelectric Projects
EC	Environmental Clearance
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FC	Forest Clearance
FEWM	Forest, Environment and Wildlife Management Department
GOI	Government of India
HEP	Hydro-Electric Project
IPP	Independent Power Producer
IPT	Independent People's Tribunal
KBR	Kangchendzonga Biosphere Reserve
KNP	Kangchendzonga National Park
MoEF	Ministry of Environment and Forestry
MoU	Memorandum of Understanding
MW	Mega Watt
NBWL	National Board for Wildlife
NHPC	National Hydroelectric Power Corporation
PA	Protected Area
R&R	Resettlement and Rehabilitation
RTI	Right to Information
SPCB	State Pollution Control Board
SPDC	Sikkim Power Development Corporation



# HYDRO-POWER PROJECTS IN SIKKIM

## A Story of Violation, Coercion and Suppression

Souparna Lahiri

### The Himalayan State of Sikkim

Located on the flanks of the Eastern Himalaya, Sikkim was a hereditary monarchy till 1975, when it merged with India to become the twenty second state of the country. The state shares its borders with Nepal in the West, Bhutan in the Southeast and China in the North. Sikkim is one of the top twenty five biodiversity hotspots in the world.

This Himalayan State, located between 27°-28° latitude and 88°-89° longitude, is spread over an area of 7,096 sq kms. Its population, according to the provisional figures of 2011 Census, is 6,07,688. Sikkim has three main ethnic groups - the Lepchas, the Bhutias and the Nepalese. The Nepali community consists of diverse ethnic groups, and forms the largest percentage of the population followed by the Bhutias. The Lepchas, who call themselves the *mutanchi rong kup* (beloved children of the God), are Sikkim's earliest inhabitants and number around a little more than 40,000. Apart from these, there are many "plainsmen" from different parts of the country settled here as well as a small community of Tibetan refugees.

Administratively, the State is divided into four districts – South, West, North and East. The habitable areas exist only up to the altitude of 2,100 m constituting only 20 percent of the total area of the state. North Sikkim is the least populated with a 7.59 percent share of the total human population. The habitation, at higher altitudes, exists mainly in Lachen and Lachung valleys comprising the upper catchment of Teesta river.

Sikkim is entirely hilly, having no plain area with an altitude varying from 213 m in the south to above 8,000 m in the north-west and north and, therefore, over a short distance, its climate ranges from tropical to temperate to alpine. The variety in elevation gives Sikkim a rich botanical wealth. The world's highest National Park (Khangchendzonga National Park) is located in this region.

North Sikkim is endowed with a number of glaciers that descend from

the eastern slopes of Khangchendzonga and western slopes of Pauhunri. Zemu glacier in North Sikkim is one of the largest glaciers in India with a total length of about 25 km. This high altitude district forms the upper Teesta basin and is endowed with a number of glacial lakes of various sizes and shapes. Prominent among them are Chho Lhamo, Gurugongmar Chho, Lhonak Chho, Green Lake and Khangchung Chho.

## The mighty Teesta

Teesta, which originates from the Zemu glacier, is a fierce and flashy river that flows down the Sikkim hills, enters the Darjeeling Hills in West Bengal in Teesta Bazaar and flows 414 km through West Bengal and Bangladesh to meet Brahmaputra. The river flows in a gradient of 29 m/km and covers a distance of 100 km in Sikkim within an altitude ranging from 8,500 m to 213 m. The Teesta and its tributaries – like Lachung Chhu, Rangyong, Rangeet, DikChhu, Chankung-Chhu, Rangpo-Chhu – comprise the Teesta Basin and have very steep slopes and escarpments.

These mountain rivers carry boulders and sediments. The flow is turbulent and is characterized by high velocities. The hill slopes are mostly friable and landslips are very common. The high rainfall (about 2,300 mm) over the steeper slopes has created a suitable environment for initiation of run-off and subsequent soil-erosion, slope failures, slides or sinking of land masses.

The Upper Teesta basin contributes to huge amounts of silt. It is characterized by accumulation of debris in the form of debris cones, rock-glaciers and alluvial fans, debris avalanches and other hazards. This debris is transported mainly in monsoon season and during the snow-melt period transportation rates of this debris become twenty times higher than normal. The sediment load calculation of Teesta River at Anderson Bridge comes out to be 2,070 acre feet/mi<sup>2</sup>/yr<sup>1</sup> which is the highest amongst Indian rivers.

## Contours

More than 43 percent of the Teesta basin in Sikkim is characterized by very steep slopes and escarpments i.e., more than 43 percent of its geo-

1. 1986, K C Tejwani, unpublished

graphical area lies in more than 50 percent slope category. The landforms and drainage of the Teesta river are characterized mainly by four tiered terraces, canyons or gorge-valleys at different altitudes, asymmetric valleys, poly-profiled U-shaped valleys and steps or troughs, lakes, alluvial cones, truncated ridge-spurs, terracettes (soil landscape systems), rectangular-barbed-parallel-trellis-radial to sub-dendritic drainage patterns, straight to meandering and braided channels. All these physiographic features are indicative of the active processes of weathering, denudation and deposition making the area physically very sensitive.

Nearly one-fourth of the basin area lies in the elevation range of 4,000 to 5,000 m. More than 59 percent of the catchment area of the Teesta basin lies above 3,000 m. Teesta basin in Sikkim, therefore, can be classified as a high altitude basin. Even the area – between the 2,000 m and 3,000 m elevation range – constitutes 16 percent of the total basin area. Only 25 percent of the catchment area lies below 2,000 m, whereas sub-tropical elevation constitutes only 6 per cent of the basin. The terraces and flood-plains, valley-side slopes and landslide slopes, alluvial cones of different types and generations, tors, kettle shaped depressions, terrace-isles, sickle shaped ranges bevelled plains, undulating plains and deeply-dissected valleys, glacial or peri-glacial deposits, related sedimentary structures, crevasses, etc. are the distinctive geomorphological features of the Teesta river basin in Sikkim. The landforms and landform assemblages, in the terrain of the Teesta river basin and its innumerable tributaries, are the result of the continuous denudation, and deposition processes that are constantly modifying the newly-formed land forms in the upper reaches and burying the existing land forms in the lower reaches.

The Sikkim Himalaya – with rugged topography, ongoing seismic activity (by active tectonics) and heavy rainfall – is subjected to intense landslide activities. The spurt of developmental activity in the region has led to substantial growth in the area affected by landslide activity.

### **Forest, biodiversity and wildlife**

Sikkim has a forest cover of more than 82 percent on its total geographical area. Sikkim is one of the most important areas of biological importance, and has been classified as a global hot spot for biodiversity conservation. Great variations in the eco-climatic conditions of the basin have given rise

to myriad eco-systems, ranging from hot humid tropics and subtropics to frigid alpine areas.

There are more than 4000 species of flowering plants reported from Sikkim. Due to the wet conditions that persist for long periods, the area is also very rich in lower plants like liverworts, mosses, *algae*, *fungi* and bacteria. In recent times, the increase in human population as well as in various developmental activities have posed a serious threat to the floristic diversity of the Teesta basin. These plants are observed throughout Sikkim inhabiting the extreme frigid region of Gurudongmar, Yumesamdong; the alpine regions of Thangu, Yumthang and Dzongri; and the temperate areas of Mangan, Chungthang and Lachen-Lachung valleys to the sub-tropical and tropical areas of Namchi, Rangpo, Jorethang; and also in lakes and wetlands.

The small area of the Teesta basin is replete with large numbers of endemic plants. More than 120 species of plants, which are exclusively endemic to the state of Sikkim, have been found. Most of them are herbs and around ten species are shrubs. Trees or climbers are very few in number. Only three tree species – *Rhododendron lanatum* of Ericaceae, *Litsea sikkimensis* of Lauraceae and *Mallus sikkimensis* of Rosaceae – are endemic to Sikkim.

More than 50 species of plants from the Teesta basin in Sikkim have been included in threatened, endangered, vulnerable or rare categories as defined by IUCN (International Union for the Conservation of Nature). With a forest cover of 30 percent, North Sikkim tops the charts when it comes to the number of flowering plants or endemic and threatened species of flowering plants. More than 60 percent of endemic species are located in North Sikkim alone.

According to secondary data, in all, 798 vertebrates and 689 species of butterflies have been reported from Sikkim including 169 mammals, 541 birds, 61 reptiles and 20 amphibians. A documentation of published information – on the number of fish species and field surveys during various studies – indicate the presence of more than 50 species of fish in the waters of the Teesta river.

In order to preserve and conserve the rich diversity of flora and fauna, more than 45 percent of Sikkim's geographical area has been brought under the protected framework of one National Park and six Wildlife

Sanctuaries under the Wildlife (Protection) Act, 1972. In addition to the existing protected areas, more areas have been proposed to be brought under the Wildlife Protection framework. The existing protected areas are Khangchendzonga Biosphere Reserve (2919.92 sq km.), Khangchendzonga National Park (1784 sq km.), Shingba Rhododendron Sanctuary, Barsey Rhododendron Sanctuary, Kyongnosla Alpine Sanctuary, Fambong Lho Wildlife Sanctuary, Maenam Wildlife Sanctuary and Pangolakha Wildlife Sanctuary.

The Red Panda, a Schedule I animal, inhabiting the Khangchendzonga Biosphere Reserve, is the most threatened species in Sikkim today.

### **Socio-economic profile**

The total population of Sikkim, as per the Census of Sikkim (2011), is 607,688 comprising 288,484 males and 252,367 females. There are only 875 females per 1000 males. About 480,981 people of Sikkim live in rural areas, while only 59,870 persons reside in urban areas. The total number of households in the state, as of 2001 census, is 114,223. The average size of household is 4.7, i.e., approximately five persons reside in each household. The overall density of population in the state is 76 persons per sq. km., which is one of the lowest in India.

The economic profile of the state shows an overwhelming dependence on agriculture and allied activities. Approximately 11 percent of the total geographical area is under agriculture. Up to 65 percent of the population is engaged in agriculture of which almost eight percent are agricultural labourers.<sup>2</sup> This indicates the importance of agriculture in the economic activities of the state and the fact that most people depend on the support provided by the limited agricultural lands.

### **Sikkim's power profile: past, present and future**

The power situation of Sikkim, before its merger with India in 1975, was in its infancy because of low demand. The power requirement of Gangtok, and a few townships located on the national highway, was met from the small 2.1 MW Jali Power House commissioned in 1964. A small

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2. Sikkim State Biodiversity Strategy and Action Plan (Draft report), Department of Forest, Environment and Wildlife, Government of Sikkim, 2003



Diesel Powerhouse was used as a standby to meet the requirement during emergencies. Similarly, Rhoathak (South) and Rimbi (West) micro-hydel, with an installed capacity of 200 KW each, were under operation to feed District Headquarters and major townships in the South and West districts. The North district had to manage with a 50 KW micro-hydel unit known as Manul micro-hydel, which has since become inoperative. Till the end of 1975, there were only eight towns that used electricity in Sikkim, while the rest of the areas had no power supply.

Till the end of 1979, the state had a total power generation capacity of only 3 MW to meet the increasing demands of the state. As of October 2007, the State had an installed capacity of 46.1 MW and from the Central sector 68.08 MW is available to the State. Sikkim's installed capacity comprises of 5 MW from thermal power, 32 MW from hydro-power and 9.1 MW from other sources.<sup>3</sup>

It is clear from Sikkim's power sector profile that Sikkim has remained self-sufficient in both electricity and peaking power. This was the situation before the commissioning of the 510 MW Teesta Stage V project. In fact, Sikkim was not even able to make full use of the power it is entitled to, as per the information from Eastern Region Load Dispatch Centre.

## Hydro-electric potential

According to the Preliminary Reconnaissance Survey, by the team of experts of erstwhile Central Water & Power Commission in 1974, the Teesta river basin could be harnessed under a cascade development for hydro-power generation. Hydro-electric potential of the Teesta and its tributaries in Sikkim, was estimated at about 3735 MW. Cascade development consists of power generation in six stages along the Teesta river. In addition, the Sikkim Power Development Corporation had identified more schemes to be developed with the help of private agencies. Under the Hon'ble Prime Minister's 50,000 MW, ten schemes were proposed for pre-feasibility studies.

## Big hydro projects in Sikkim

The Central Electricity Authority (CEA) – in its 2001 preliminary ranking

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3. Eastern and NE Region Update of Ministry of Power, April 2007 & Oct 2007

study of the hydro-electric potential of river basins in India – identified 21 large projects in the state of Sikkim to generate 3193 MW of hydro-power. Following this study, a 50,000 MW hydro-power initiative was launched in 2003 under which Pre-feasibility Reports for ten projects in Sikkim have been prepared. These projects are proposed to generate a total of 1469 MW. Out of these, four projects, totalling a generation capacity of 835 MW, have been short-listed for further investigation (based on lowest tariff). The projects, mentioned in the 50,000 MW initiative, do not include Teesta II (330 MW), III (1200 MW) and IV (495 MW) which are additionally being pursued by the state.

The projects in Sikkim have been projected as low impact projects as they are “run of the river” projects which have small submergence areas as compared to those of storage dams. The loss of lands and homes and the subsequent displacement of people due to submergence is identified as the core area of the decision-making process on dam projects. Since the number of people, directly displaced by run of the river projects, is small, these projects are seen as low impact projects. But run of the river projects involve large scale tunnelling and blasting which have severe social impacts in the entire project area and surrounding areas, as well.

While various agencies and governments are painting a rosy picture of the hydro-electric potential of Sikkim, the only large hydro-power project, that was in operation before the commissioning of Teesta V, was the 60 MW Rangit HEP, commissioned in 1999-2000. This project has achieved its design energy only in 37.5 percent of the years, when it should have achieved that in 90 percent of the years. Also the construction of the Teesta Stage V hydro-electric project by NHPC at Dikchu has raised enough concerns ranging from lack of proper consultation with the local and affected people, severe destruction of the immediate environment, the precipitation of cracks in the houses within the project area, drying up of water sources in the surrounding villages, dumping of muck in the Teesta river and on forest land, the increased incidence of landslides and the non-disbursement of proper compensation to affected families.

The Government of Sikkim is not willing to learn from these experiences. The power department drawn up a list of proposed hydro-electric projects and MoUs and letter of intents were signed accordingly. A total of 28 such projects were listed by the power department.

## **Hydro-projects proposed at random: recommendations ignored**

The projects – identified by CEA, the Prime Minister's 50,000 MW initiative and those additionally proposed by the State Government of Sikkim – were undertaken at random. The driving force was a notion of hydro-electric potential of the Teesta River Basin and a skewed sense of economic benefits and national interest.

The arguments, that are used to justify large projects in Sikkim, are the exploitation of the state's perennial water system to produce cheap, plentiful power for the nation, economic benefits through power export, employment generation, flood control and little direct "displacement" of local communities. The State seeks to generate huge revenue by trading the 12 percent free power given by project developers. However, several unique features of the State – the geological fragility and seismic activity, the high sedimentation load of Teesta and its tributaries, the unique tribal communities and their cultural and spiritual association with river systems, their traditional natural resource-based livelihoods and the biodiversity richness of the area – pose a challenge to conventional dam-building wisdom.

It was only when the Teesta V Project applied for environmental and forest clearance that the Expert Committee of the Ministry of Environment and Forests on River Valley Projects sought detailed studies on ethnography and biodiversity to understand the impact of the proposed project on biodiversity and local communities of Sikkim. The expert committee also felt that the project should be cleared only after a carrying capacity study of the river Teesta is done. However, this was not agreed to by the project proponent, the NHPC.<sup>4</sup> As a result, Teesta V was delinked from the carrying capacity study and considered for clearance. One of the conditions of clearance for Teesta V was that no new project would be allowed in the Teesta basin in Sikkim, until such a study was completed.

Teesta V was granted environmental clearance before the study on ethnography and biodiversity was completed. This was done in flagrant violation of the MoEF's own expert committee recommendations. Six projects –including Teesta V, Teesta III, Panan, Teesta VI and Chujachen– were

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4. Letter from A. K Gangopadhyay, NHPC to Additional Secretary, MoEF dated August 20, 1998.

cleared by the MoEF before the detailed carrying capacity study of Teesta river basin was completed and made public by the MoEF.

The carrying capacity study of Teesta basin, which was conducted by the Delhi based Centre for Inter-Disciplinary Studies of Mountain and Hill Development (CISMH), University of Delhi, made the following observations:

- Upper Teesta basin is characterised by a huge accumulation of debris cones, rock-glaciers and alluvial fans, debris avalanches and other hazards. This debris is transported mainly in the monsoon season and during the snow-melt period. The transportation rates of debris become twenty times higher than normal during any catastrophic event;
- The large spread of the shear zone and the fragility of the rocks present in this zone demand more detailed investigations in this region in order to locate stable zones where developmental activities can be carried out with minimal fear of future natural destructions;
- The thick moraine deposits, at several sites in North Sikkim, provide weak substrates on which it is very unsafe to establish any mega developmental project;
- Establishment of any small projects in this region would require detailed surface and sub surface investigations, as well as proper engineering and seismic designing;
- The frequency of landslides, in the last few years, may be partially attributed to the negative impact of developmental activities on the geo-environmental set-up of the region;
- The loss of land and the process of environmental degradation are irreversible and, therefore, preventive and protective measures have to be taken in right earnest;
- The cost of inaction can be enormous in terms of loss of human lives and natural resources. Also it would adversely impact developmental programmes and economic activity.

Physiographic studies show that the valleys in the northern parts of Teesta basin are asymmetrical which indicate instability and proneness of slopes to sliding. Glacial moraines – mostly confined to North Sikkim,

along with numerous active landslides in the region – indicate that this locale represents a fragile ecosystem. The presence of thermal springs is indicative of instability; glacial lakes represent a serious threat in the event of a cloud burst or rock slides resulting in the bursting of these lakes and serious hazards downstream. Majority of these glacial lakes are undergoing structural changes which is an indication of their vulnerability to bursting and downstream flooding.

The present study shows that the project area of Teesta Stage-III is very important in the sense of conserving the biodiversity of the region. Similarly, the area – in the vicinity of proposed Teesta Stage-I & Stage-II HE projects – is home to a high number of breeding birds and exclusive species of taxa. Hence, any development project would endanger them. Also, Zones above III are geologically vulnerable and anthropogenic pressures would lead to natural disasters.

Most constituent watersheds of the Teesta river basin, in all the four districts of Sikkim, are an extremely geologically sensitive and ecologically fragile area with low carrying capacity for large developmental project works. There is very little scope for having dams with heights above 80m from the river bed level, especially in North Sikkim as most of the valleys in this area are heavily glaciated with slopes covered with large amounts of debris cover. Added to this is the sensitive seismic regime of this area.

Large bondage and any kind of storage – like diurnal storage – should not be allowed in West and East Sikkim. This is more so in the watersheds of Rangpo Chhu, Rathang Chhu and Rangeet River. The dams, coupled with related activities – like road, building and blasting for tunnelling – would have a serious impact on the stability of the slopes and the biological diversity in these areas. However, smaller hydro-power projects – around Chungthang and Mangan – could well be feasible. However, smaller projects – above Chungthang in North Sikkim – would be extremely detrimental to fragile ecosystems.

### **Teesta V: The first sign of imminent disaster**

Teesta V, with an installed capacity of 510 MW at Dikchu in East Sikkim, was the first mega hydro-electric project in Sikkim after Rangeet. Entrusted to NHPC, this project has always been mired in controversy. A public hearing for the project was held not in Dikchu near the project site, but

in Gangtok where not too many local and affected people could participate. Enough information was not disseminated among the local people in Dikchu and the villages around the project site.

The work on the Head Race Tunnel (HRT) and the associated "adits", at five places along the tunnel length, have led to serious problems. Local people, living above the tunnelling area, have complained of cracks developing in houses, drying up of water resources and landslides. The project site has suffered setbacks due to surge shaft and tunnel collapses.

The tunnelling also makes necessary the removal of huge quantities of muck and rock debris. NHPC has earned itself the name of Uttani Musa (Mountain Mouse) for digging out the insides of the Sikkim mountains. The disposal of muck had been handled very poorly in the project. Although there are sites demarcated for muck disposal in the Environment Management Plan of the project, large quantities of muck have been dumped directly into the river, constricting the river flow and increasing the threat to downstream areas or nearby reserved forest areas. The V-shaped valleys offer limited flat lands for disposal.

Since early 2001, the Forests, Environment and Wildlife Department (FEWD) of the Government of Sikkim started detecting violations of forest laws. They identified that the NHPC had been dumping huge quantities of excavated muck and debris into the river, on the river banks and surrounding Reserved Forests. The Department was compelled to file a case against the project proponent for these violations and a similar complaint was filed before the Central Empowered Committee (CEC) of the Supreme Court, where NHPC was penalized and directed to restore the forest lands. Other violations, detected by the state government, included the setting up of labour colonies and project activity sites illegally on forest land; the setting up of other project components on designated muck disposal land as per the Environment Management Plan (EMP); and untreated sewage being released straight into the river.

Continued non-compliance by the NHPC, despite repeated summons/notices/reports, forced the FEWD to file a petition in the Court of the District Judge (East & North) Sikkim (Civil Suit No. 28 of 2002) against the company and its contractors in late 2002. A compensation of Rs. 14 crore was sought by the Department. In November 2002, the court issued an ad-interim injunction restraining the company from violating the law. FEWD filed four contempt petitions since the NHPC failed to

comply with the court orders. The Ministry of Environment & Forests (MoEF) verified the violations and in September 2003 gave a show-cause notice to NHPC for violations of environment and forest laws, thus supporting the state government's action.

The Independent Review Committee on Big Hydro-Projects of Sikkim, a civil society initiative which visited the project areas in May 2008, stated in their Press Release dated 20 May 2008:

*"We see that the Sikkim Government, partly under pressure from the central government has hastily committed itself to develop large number of big hydro-power projects, without much consultation with Sikkim citizens, without considering the implications of the projects for the local people, environment, culture, future generations and even return on investment for the state and the people. It has also not seriously assessed the options available for electricity generation or options for development in general. This is evident in the way the Teesta V has been developed, the way Panang HEP MOU has been signed and Teesta III implementation has started."*

The Committee said that on Teesta V, "It is important that the government asks NHPC to institute credible independent review and resolution of the outstanding social and environmental issues in a time-bound manner. We found that scores of houses have developed cracks, the water sources of the communities have dried up, the project site has been left ugly, without restoring the site as required and the tunnels are already leaking. We found that the huge amount of silt has also been accumulated behind the dam already and the project had to stop generation of power for the last five days. The state government should also penalise NHPC for not taking care of these problems before commissioning of the project. We also found from the affected people that there seems to be massive corruption in payments of compensations, unearthed by the affected people through RTI. In some cases, the affected people seem to have been paid Rs 5000/- when records show they have been paid Rs 35000. A credible independent investigation into this aspect is also urgently required."

The Independent Committee visited the Teesta V site on 17 May 2008, when the project was already commissioned and met the villagers of Ralap and Singbel. The team saw water seeping out of Adit V, though the project was not generating power on those days. The entire construction site was deserted without any restoration work. Rocks, muck, cement were lying in heaps. No work on reclamation, green belt could be

observed. The team observed that water resources – in the villages of Ral-ap and Singbel, along the headrace tunnel – had dried up completely and the villagers had no choice, but to depend on water tankers provided by the NHPC to sub-contractors. The villagers also said that their orchards and farmlands had been damaged due to lack of water.

The team saw cracks develop in the homes of Menoka Chetri and Jung Bahadur Thapa for which they were not compensated. The team was also told that everyone affected by the construction of the dam could not possibly be compensated. However, a document, accessed through RTI, shows that the names of the affected parties and the corresponding compensation amounts exist in NHPC accounts.

The day the team visited the Teesta stage-V site, there was no power generation and the river had full flow as the gates were opened. Heavy siltation and sediment was observed. Even the protection wall, along the reservoir ream, was covered by silt. The status of the school and the temple in Dikchu Bazar, along which the protection wall was built, was of great concern. Subsequently, during the first week of June 2008, the news came that this protection wall had been breached twice.

Today, it can safely be said that the NHPC not only deprived the locals of job opportunities, but also failed to rehabilitate displaced persons. Grievances have not been redressed. The rights of the local and affected people have been met with a callousness and complete disregard. This has led to the emergence of series of protests by the people of the East District including the Lepcha and Bhutia communities. By the time Public Hearings were organized in 2006-07 – for Teesta Stage-III, Panan and Teesta Stage-VI – serious concern and apprehensions developed amongst the communities in the North District, especially in Chungthang and the Lepcha Reserve of Dzongu. While Chungthang is the site for Teesta Stage-III project, seven projects were proposed inside Dzongu, the Lepcha Reserve and the ancestral homeland of the Lepcha community.

## **Large dams in Dzongu**

Six projects – Rukel, Rangyang, Ringpi, Lingza, Panan and Teesta stage-IV – have been proposed in the Lepcha Reserve which has a total population of 7000 people. The power house of Teesta stage-III falls just outside the boundary of Dzongu. Teesta III has got all the clearances and is un-



der construction while environmental clearance has been accorded to the Panan project.

The Lepcha Reserve of Dzongu is located in the north-west of Sikkim and the Lepchas here are considered the indigenous people of Sikkim, with their own and unique cultural and religious practices and beliefs. The Lepchas of Dzongu have generally lived in relative isolation, and are primarily dependent for subsistence on agriculture and the cultivation of native cardamom.

The Lepchas of Dzongu are protected by the Proclamation dated 30<sup>h</sup> August 1956 of His Highness Sir Tashi Namgyal, the Maharaja of Sikkim and the Notification No. 3069/O.S. dated 24 March 1958 and issued by the Home Department, Government of Sikkim.

The Proclamation states, "No unauthorized transfer of land (transfer without the written permission of the Sikkim Darbar) by Bhutia and Lepcha Sikkimese to Nepali Sikkimese subsequent to the issue of this Proclamation shall henceforward be held valid by the Courts irrespective of such laws, rules, regulations and usage regarding limitation of suits as may be applicable in other cases."

It concludes, "The rules relating to the settlement and/or the carrying on of any occupation in such areas (i.e., North of the line formed by the Dick Chu from the Chola, down the Tista to Ranghap Chhu, up the Ranghap Chhu till it meets the 27' 25 minutes latitude and hence along it to the Western border of Sikkim) by outsiders (non-indigenous) only on a permit issued by the Sikkim Darbar shall continue to hold force."

Notification No. 3069/O.S. clearly says, "It is hereby ordered that any outsiders, (non-indigenous) settling and/or carrying on any occupation in the prescribed areas without a permit issued by the Sikkim Darbar shall be liable to imprisonment up to three years and/or fine up to Rs.1,000 in default imprisonment up to six months."

These Proclamations and Notifications continue to offer protection to the Lepchas of Dzongu and the indigenous people of North Sikkim vide Article 371(F) of the Indian Constitution which was promulgated after the merger of Sikkim and was subsequent to the 8th May Agreement.

When the Independent Review Committee spoke to the villagers, of both upper and lower Dzongu, the following points emerged:

- There was considerable social tension and divide within Dzongu

created on the issue of hydro-projects. Families were divided and siblings were engaged in litigation related to land compensation;

- Ruling out the demand for compensation to the tune of Rs 50/sq ft, compensation – for acquired land – was paid according to a government notification and the rates paid were Rs.18/sq ft for agricultural land, Rs.16 for cardamom land and Rs.14 for dry land; land, belonging to many families, was still not mutated in the name of their adult members. Therefore, compensation money created tension within the families since, in many cases, other claimants did not receive the compensation money. Also land was given away without any authorization of the other claimants;
- Many of the claimants did not even receive the declared amount;
- There was apprehension about the influx of outsiders, the detrimental impact on their tradition and culture and the destruction of their homeland, resources, sacred groves and springs;
- A large number of villagers were angry with the undemocratic way the government has dealt with this issue. There is no participation of the common people in the decision-making process. Decisions are taken by the Sikkim Democratic Front (SDF), the main political party in Sikkim, ruling the State;
- During the public hearing of the Panan project, two youths were detained in a police vehicle and were not allowed to participate in the hearing;
- A raft, with a team of surveyors, was intercepted by a group of people in lower Dzongu near the site of Teesta IV. They were not allowed to do any work and were driven out of the area since they had no valid permits to enter Dzongu. Two youths were later arrested and put in to judicial custody for fifteen days for preventing this team from their survey work;
- A large number of villagers seemed to be emotionally attached to the issue of the hydro-projects and protection of their homeland. But, few are coming out in public out of fear of losing their jobs and livelihood;
- Those who did come out and were employed in the government, were transferred out during the protests organized by the Affected Citizens of Teesta (ACT) during 2007-8;

- The Panan dam site is located within the buffer zone of the Khangchendzonga National Park and is hardly two kms from the core area of the Park.

The shadow of Panan has come back again to haunt the Lepcha community of Dzongu. The Panan project is envisaged to utilize the flow of Tolung Chu, a tributary of the Teesta, to produce 280MW of hydro-power. It is a run-of-the-river project with a 56m concrete gravity dam and a 9.8 km long head race tunnel cutting through the sacred hills and forests of Dzongu. The project developer is Himagiri Hydro-Energy Pvt. Ltd.

During the Public Hearing of Panan held in Namprikdam, Lower Dzongu, the majority of those attending the Hearing said “No” to the project. The environmental clearance to Panan was given on the basis of a flawed EIA and EMP. Affected Citizens of Teesta (ACT) had, on several occasions, written to the Expert Appraisal Committee (EAC) of the MoEF citing serious problems with the reports. Concern was voiced against the dumping of excavated soil, muck using explosive blasts for digging tunnels and the influx of workers in the Protected Lepcha Reserve.

Brushing aside all concerns, the MoEF did accord environmental clearance to Panan. Subsequently, a condition was attached to the clearance – which relates to the establishment of labour quarters and influx of workers appointed – for the project. There was a clear directive from the MoEF that no labour quarter could be established within the Dzongu Reserve and that the workers would have to be transported in and out of Dzongu everyday. This condition was violated by Himagiri without attracting any action from the MoEF. The clearance conditions were never monitored by the MoEF.

Similarly, the forest clearance was issued to Panan where the proposed project and the related activities were deemed to violate various forest laws such as : the Wildlife Protection Act 1972, the Supreme Court order in the T N Godavarman case (1996), the Sikkim Government Notification of 1997 regarding Khangchendzonga National Park (KNP) and the various Notifications of the MoEF related to National Parks, Sanctuaries and Biosphere Reserves.

In its petition before the Central Empowered Committee (CEC), challenging the forest clearance, ACT argued accordingly that an array of project related activities – such as Catchment Area Treatment (CAT),

check dams, stone-quarrying and afforestation – would be carried out within the core and buffer zones of the KNP and the Biosphere Reserve as detailed in the EMP of the Panan project in violation of the above, subsequently petition was withdrawn.

Thus, first of the seven proposed projects in Dzongu were cleared in 2007 in clear violation of the law of the land and the will of the Lepcha community of Dzongu.

### **Teesta Stage- III: Hydro incursions beyond Dzongu**

Teesta III hydel project – with a capacity of 1200MW – is now under construction in Chungthung under the North District of Sikkim. The project is developed by Teesta Urja, a consortium of five companies headed by Athena. The dam site is located at the confluence of the Lacheng and Lachung rivers from where the mighty Teesta emerges and is a sacred place for both the Lepcha and Bhutia communities.

This is the biggest and the most controversial project in Sikkim which was handed over to a relatively new private developer. The project was simply forced onto the people of Chungthang. After Teesta stage-V project and Panan, Teesta Stage-III hydel power projects was taken up before the carrying capacity study of the Teesta Basin was published, well in violation of the direction of the Environmental Appraisal Committee (EAC). The Public Hearing was fixed for 8 June 2006, but the copies of the EIA and EMP were not available in the public domain. ACT managed to get a copy only on 2 June 2006. ACT challenged the validity of the Public Hearing on procedural grounds for violating the provisions of the EIA 1994 Notification. The notice, for the public hearing, failed to mention the EIA/EMP reports, their summary in Nepali and their mandated availability in the prescribed offices of the state government. Their contention was overruled and the State Pollution Control Board (SPCB) continued with the Hearing.

The Hearing, on June 8, 2008, was organized in total violation of EIA 1994. The project developer – instead of merely presenting in brief the salient features of the project, its impact, mitigation and management plan – spoke on how important the project was and the need to treat it as a top priority matter. The local MLA and the Minister of Power, Government of Sikkim, spoke in support of the project and requested the locals

to support the project for their own benefit. The chairperson of the SPCB wanted the people of Chungthang to accept the project, since the Central Government wanted this project and called in public, those opposing or criticizing the project, anti-Sikkimese and anti-National! The Government of Sikkim made all efforts to bulldoze the people of Chungthang into submitting in favour of the project. ACT leaders and activists were threatened from the panel of the Public Hearing.

A video documentation – of the Public Hearing, together with a critique of the shoddy EIA report – was presented to the EAC of the MoEF by ACT. Teesta Stage-III project, however, was granted environmental clearance. The EAC accepted the incomplete and shabby quality of the EIA report for Teesta stage- III project. The report had misleading data on several counts: (i) the affected villages, (ii) the Lepcha and Bhutia population of the project area. In addition, the report did not have the required mandatory environmental risk analysis, nor did it have the objective mitigation plan for noise pollution.

The report did not take the specific and locational impacts of hill cutting and road construction, in an ecologically fragile mountain area into account. Head race tunnelling through the hills and biodiversity rich forests of Dzongu, leading to the power house, were met with supreme disregard. At no point was a social and cultural impact analysis on the local population of migrant labour ever studied. No effort was made to understand the wildlife and biodiversity aspects of the project area falling under the crucial Khangchendzonga Biosphere Reserve.

The blanket clearance – given to Panan and Teesta stage- III Hydro-power projects – dealt a death blow to the democratic fabric of this land and shattered the confidence of the local population and of the Lepcha community in particular. Corporate power prevailed and the legitimate voices of the people were ignored. But, it also helped to strengthen the resolve of the ACT activists and their supporters. ACT, ably supported by Concerned Lepchas of Sikkim (CLOS) and Sangha of Dzongu, went in to a series of mass protests demanding the scrapping of hydel projects in Dzongu. They organized rallies, demonstrations and meetings throughout 2006. However, there was very little response from the Chamling-led Government and assurances were never fulfilled.

## **Implications of the struggle of ACT on the development discourse in Sikkim**

The hydro-power juggernaut in Sikkim began rolling in 1999 with the clearance of the Teesta V Project developed by the public sector undertaking, NHPC. Centering on the Prime Minister's Hydro-power Initiative and development of Sikkim, the State Government, under Pawan Chamling, went on to sign 27 more projects within a span of five to six years. Such a major policy step was taken and implemented without assessing the impact and implications of such mega hydro-projects on the Teesta River Basin which is the lifeline of Sikkim and a source of water and livelihood for a large number of its people and riverine communities. There was no consultation with the civil society, NGOs or the communities who were going to be affected by such projects.

Instead of cumulative impact assessment and carrying capacity study of the Teesta Basin, the government depended on the project EIA done by the project developers themselves. At least six hydro-projects were already cleared even before the MoEF made public the carrying capacity study as directed by its EAC.

Realities of a fragile ecology, geological surprises and consistent seismic activities were brushed aside in favour of revenue earnings through free power and temporary employment generation. The development discourse, promoted by Chamling and SDF, considered short-term gains rather than long-term and irreversible impacts. That discourse also gave in to private corporate power as the events unfolded.

The emergence of the ACT and their struggle was the first major political expression against the prevalent development discourse in Sikkim. The Lepchas, one of the major indigenous communities in Sikkim, being gradually turned in to a minority over the years, challenged the brute political majority of the SDF through mobilization of genuine voices of concern – the affected and the marginalized – in a peaceful, non-violent manner.

ACT represented, expressed and led the struggle for the economic, political, social and cultural rights of the indigenous people of Sikkim and gave shape to their assertion in challenging the unilateral and coercive governance by the Chamling led SDF. Dams over Teesta, thus, became a major political issue in Sikkim.

Not surprisingly, the so-called Green Chief Minister became instrumental in violating people's Constitutional Right to Freedom of expression, dissent, right to association and right to life and livelihood. The government apparatus, riding on a brute majority, tried to suppress the rising political voice of the affected and the marginalised, while it upheld and promoted the power of the corporate lobby.

The path of confrontation – that the Government of Sikkim followed while promoting its hydro-power policy without any meaningful consultation with its people – did not help them either. During the past ten years, it has not been able to fulfill its target of hydro-power generation according to the 9<sup>th</sup> and 10<sup>th</sup> Five Year Plans. The projects had cost overruns and all the projects are running behind schedule. Thus, it is amply clear that development cannot be bulldozed through coercion and violation of people's rights. Development has to be understood, accepted and promoted by the people themselves. A Government alone, without the participation and consent of the people, will not be able to successfully promote a development policy. The story of hydro-power development in the Teesta basin of Sikkim and the historic struggle of the Lepchas prove that.

But recent events point out that the Government might not have learnt a lesson from the past decade. The Chamling Government has managed to overturn the decision of the MoEF on moratorium for projects upstream of Chungthang and six projects have again been opened up for consideration. The most controversial Teesta IV hydro-power project within Dzongu is coming up for environmental clearance also.

It will be unfortunate if the Government tries again to precipitate another crisis by its unilateral actions. The relative calm cannot be taken for granted. Development cannot be induced through force and brute majority. It is a political decision and needs political consensus.

# MY BRUSH WITH MEGA HYDEL PROJECTS IN SIKKIM

Tsering Tashi

**A**lley Ground, Namchi, South Sikkim. 26 January 1992. Time: 10.45AM. Occasion: Republic Day. The day was memorable on many counts. To begin with, I got promoted for the first time after serving the Government for fourteen years non-stop. Then, Dr. Pawan Chamling graced the occasion as the Chief Guest. Dr. Chamling gave highly emotionally charged advice to the students and the youth. He wanted them to acquire education and training (like the District Police Chief, Mr. Rao) and not become a breed of people who have no option, but to slide into mute submissiveness to achieve their small ends. I was really impressed with his oratory. I had a vague feeling at that time that Dr. Chamling might become an important person at a later time. Finally, on the occasion of Republic Day or Independence Day the practice is to distribute bulky issues of the *Sikkim Herald* containing, apart from other information, the speeches of the Governor and the Chief Minister to everyone present on the occasion. As I was glancing through the contents, I came across the Notification of the National Hydro-electric Power Corporation Ltd. (NHPC) dated 24 January 1992 announcing the likely start of Teesta Hydro-electric Project Stage-III (1200MW) in Sikkim (now run by Teesta Urja Ltd). The Notification invites observations, for and against, from individuals or institutions within a given time frame. I was on a high due to the first-ever promotion and the inspiring speech of the Chief Guest. I wanted to tender some observations.

With so many things swirling in my head, I headed back to Gangtok after the function to report to the Head of the Department and join the new post. The next day I met the Secretary (Mr. L. Lecha) and discussed the issues that I wanted to send to the NHPC for their response. The Secretary, after reading the points, said that he, too, wanted to do the same. With few changes here and there those issues – the role of the project in irrigation, flood-control, life of the project, reservoir induced earthquakes, river sediment studies, rehabilitation of displaced people, damage



to the local environment and cardamom cultivation – were sent to the Chief Secretary, Government of Sikkim. It took some time to get the first response from the authority concerned. We were not very convinced with it and wrote back again asking for certain clarifications. More correspondence followed. Ultimately, we were told to shut up and obediently we remained silent.

Large dams – those higher than 50 feet – alter the riverine systems in the form of alteration of the flow of rivers, drowning of submergence zone, crop-lands and/or cultural sites, interference with migration of aquatic animals, displacement of people and so on and so forth. Large dams cause reservoir induced earthquakes and landslides. It is reported that in 1950 there were 5000 large dams worldwide and by 2010 the number had grown over to 45,000. That amounts to an average of two new large dams constructed each day, half of them in China. China's Three Gorge Dam on the Yangtze River is estimated to have displaced over two million people and flood 240,000 acres of crop-land and cultural sites. The dam is within a seismic belt. If the dam survives its life, the whole world should salute China for its audacity and reservoir of engineering skills.

Sikkim is estimated to possess hydro-electric potential of 8000 MW peak and a firm base of 3000 MW, i.e., it is techno-economically feasible. Full throttle effort is on to exploit the virtually untapped rivers and streams of Sikkim by private power developers, the NHPC and the State Government. Around 25 mega power projects are likely to come up in the State of Sikkim in the near future if all goes well. Two hydel projects – Rangeet Stage-III H.E.P. (60MW) and Teesta H.E.P. Stage V (510MW) of NHPC – are already commissioned and in operation. The rest of the projects are at varying stages of preparation or completion.

The Environment & Pollution Control Division of the Forest Department, Govt. of Sikkim, has been entrusted with the job of carrying out the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) of power projects in Sikkim. In July 1997, the Forest Department formed an Impact Assessment Committee where I was included as one of the experts on the issues of geology, geotectonics and the likely occurrence of reservoir induced earthquakes/landslides of the area earmarked for Teesta HEP Stage V. The committee was called for a meeting on 31 July 1997 at 1 pm in the Conference Hall of the Forest Annexe Building. The meeting was chaired by the PCCF-cum-Secretary,

Forest, Mr. P.K.Basnet (IFS). We met and discussed the issues without having seen the Pre-feasibility Report (PFR) or the Detailed Project Report (DPR) or the area. Today, after seeing the reservoir induced draw-down effects around Jang Village and Aap Dara, I regret being one of the Members of the Committee. The villages located on the left of the submergence zone are steadily subsiding due to suction/drawdown effect in the absence of rim treatment and other protective works. The rate of subsidence is cumulative and with the passage of time the effect becomes more pronounced and destructive. Around 45 houses – including concrete buildings at Jang Village – have become uninhabitable. Three severely damaged houses were vacated in 2010 and the house owners were provided with compensation by the NHPC and were relocated elsewhere. Houses and other structures at Aap Dara village are facing similar problems of increasing magnitude. Because of steady down slope movement of slope forming materials – due to natural causes as well as draw-down effects – the reservoir volume is also getting reduced (see picture below).



Environmental Impact Assessment and Environmental Management Plan of power projects in Sikkim are mandatory vide Notification No. S.O. 60(F), dated 27 January 1994 of Ministry of Environment and Forest, Government of India. Therefore, the Department of Forest, Environment & Wildlife Management, Government of Sikkim, has constituted an EIA/EMP committee vide Memo No. 285-306/FEWMD dated 7

October 2005 to study the Pre-feasibility Reports (PFRs) and Detailed Project Reports (DPRs) and carry out field verifications, if necessary, followed by necessary clearances, Public Hearings and so on and so forth. I was a Member of the Committee till 27 August 2007. During the period of our membership of the committee, we met as and when a power developer wanted to submit a DPR for our scrutiny. The DPRs are invariably distributed at the time of the meetings and the EIA/EMP members of the committee are often unable to discuss the project details threadbare during the meetings. The members are, however, at liberty to read the DPRs at their own pace or throw them away after each meeting. I read all the reports carefully and found them identical in style, language, layout, geological descriptions, mapping etc. I read them carefully because I was very much concerned with reservoir – induced earthquakes, dam bursts and fish migrations. Therefore, during the last few DPR presentations, I repeatedly asked for details of dam burst analyses and fish ladders. None of the project developers were able to give us satisfactory answers. Today, even after having been thrown out of the EIA/EMP Committee for no reason whatsoever, I still consider these two areas as requiring urgent attention.

It is commonly believed that the water resources of Sikkim can make the Sikkimese rich and prosperous. Only time will tell if this claim has any veracity.

### **Threat of landslides and seismicity In Sikkim Himalaya**

With a total geographical area of 7096 sq. kms., Sikkim is the smallest amongst the North-eastern Council States. It lies between 27°04'46" – 28°07'48" North Latitude and 88°00'58" – 88°55'25" East Longitude and has an elevation range of 250-8584 metres above the main sea level. The State's increasing population and developmental activities and depleting land and natural resources are matters of serious concern. Seismic and landslide vulnerability hazards compound the evolving scenario.

The Sikkim Himalaya has never been and will never be free from the ubiquity of a weak geology, slope instability, frequent seismicity and soil erosion. This is mainly due to natural causes and is also the result of accelerated degradation. These adverse conditions have exacerbated the already fragile, vulnerable and multi-functional mountain ecosystem. So

far disasters caused by landslides, earthquakes, floods etc., have not lead to large-scale human tragedy in Sikkim in recent memory. However, there is ever increasing human demand of natural resources, especially land for urban development and mega dams, in an apparently unsustainable manner, making some of the denizens adapt and survive at dangerous margins. The emerging crisis can perhaps be minimised by indigenous knowledge-based modern technological interventions. To safeguard against accelerated degradation and improve the living standards of the hill people, the Governments (Centre and state) need to address hill-specific issues through systematic and effective integration of the ecosystem services and development and highland and lowland linkages. Without a replicable and hill-specific developmental policy, the ever-present threat from devastating landslides, earthquakes, floods etc., remains and the future is jeopardised.



# RESETTLEMENT AND REHABILITATION OF TEESTA STAGE-V HEP

Dr. Doma T. Bhutia

**T**he road leading to the R&R (Resettlement & Rehabilitation) Colony at Dhudhey Dara is extremely steep and isolated from the rest of Sikkim. It is so steep that it is hard to imagine how pregnant ladies, elderly or disabled persons can ever traverse it, especially at night when there are no lamp-posts illuminating the way, or during the monsoon season when the concrete road turns dangerously slippery. A handful of identical "model houses" have been built on top of a windy hill for the hundred percent land oustees. Their lands were acquired for the construction of Teesta Stage-V HEP. The houses, in the R&R Colonies, are small, with a kitchen and two bedrooms, and are supposed to accommodate the whole family, irrespective of its size. These house have hardly any land around them and farmers have no cultivable land or livestock. The sources of livelihood, within the colony, are virtually non-existent. Usually one male member of the family, who is the head of the family, is given employment as labourer in the said NHPC at a meagre salary of Rs. 8000-10,000 per month.

In the course of fact finding, it was found that the package of R&R was given to only those farmers whose 100% lands were acquired by the government on behalf of the company at shockingly throw-away prices. Hence, it is easy to see the farmers made to pay the price for sake of so-called 'development' and to protect the interest at the risk of their livelihood and future displacement of their kith and kins. The R & R Colonies lack basic amenities or infrastructure as the house provided under the R&R scheme are very small and are closely bunched together. Hence, due to space constraint the farmers feel completely uprooted from their ancestral lands, loss of identity, displacement of their siblings and the worst is losing their traditional knowledge of farming. Despite losing everything farmers dare not to raise a voice of discontent against the company or against the government as it would incur loss of poorly paid jobs which

remains the only source of livelihood at the cost of their ancestral fertile agricultural lands.

The Resettlement and Rehabilitation colony at Dhudhey Dara does not have any basic infrastructures like shops, schools, hospitals, and livelihood support, and opportunities are virtually non-existent. Therefore, most of the farmers do not wish to live in the said R & R Colony and deserted the same because it means to live in isolation virtually in a condition of excommunication from the community. The R&R colony at Dhudhey Dara offers spurious rehabilitation as it doesn't address the needs and necessities of the displaced people. The experience from many other hydro-power projects throughout the country reveals grim pictures as the displaced are still struggling for their rehabilitation. It is often taken as a "technical project", not as a human and social issue. Forest resources, grazing lands like fishing opportunities and so on and so forth are rarely provided access at the R&R sites. The social, cultural, economic and psychological impacts of the displacement are profound. Therefore, as Kothari & Patel (2006: 56) have pointed out, "It is an irony of fate that the ones who suffer the most from these development projects are called the beneficiaries of the compensation and rehabilitation packages."<sup>1</sup>



1. Kothari, A. & Patel, A. 2006. Environment and Human Rights, 56-57. National Human Rights Commission, India.

# THE JUDICIAL TYRANNY OF LAND ACQUISITION<sup>1</sup>

Colin Gonsalves

## **The first phase:**

### **The Supreme Court against the farmers**

No statute in colonial India, or Independent India, has even been more used against the interests of the poor in as systematic and widespread manner, nothing but colossal misery, through the Land Acquisition Act, 1894. From Independence to 1995, 300 million persons have been displaced from land due to a variety of reasons including that of forcible displacement for public projects. The judiciary has played a significant role in executing this statute without care for the effects of land acquisition on small and medium landholders and on agricultural labourers. This is an article which proposes to tell one part of the legal story about how the judiciary has remained oblivious to the suffering of the rural people. The entire story is difficult to comprehend that requires careful research and analysis. But this one chapter will probably serve the purpose in indicating how blind the legal system has been to the plight of the working people. This article focuses on land acquisition under Part II – for the state and instrumentalities and agencies of the state – and compares this with Part VII of the Act – which is acquisition for a company.

At the time of the enactment of the Land Acquisition Act, 1894, the second Select Committee – in its report dated 24 January 1894,<sup>2</sup> submitted to the Council of the Governor General of India – gave an explanation regarding the proviso to section VI of the Act. The proviso is as under:

Provided further that no such declaration shall be made unless the compensation to be awarded for such property is to be paid

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1. This article is substantially based on submissions made in Special Leave Petition (Civil) No. 17461 of 2006, *Leela Nagesh Mandke Vs. State of Maharashtra*, pending in the Supreme Court of India.

2. Bombay Government Gazette Part VI, and dated 01.02.1894 pp. 18 – 29 : Gazette of India Part V, 27.1.1894 pp. 23 & 24



by a Company, or wholly or partly out of public revenues or some fund controlled or managed by a local authority.

The explanation given by the Select Committee was as follows:

The object of the amendment we have suggested in the proviso to Section 6 is to enable land to be acquired under the Bill for the purposes of colleges, hospitals and other Public institutions which are in some cases only partly supported out of public revenue or the funds of local authorities.

The Land Acquisition Bill was introduced by Mr. H. W. Bliss who explained the difference between the two Parts thus: "Part VII of the Act lays down the procedure to be adopted when it is sought to acquire land for company's [sic]. It indicates, though perhaps not so clearly as desirable, that it is not intended that the law shall be put in force for the acquisition of land for all company's [sic]. It is not intended, that is to say that the Act shall be used for the acquisition of land for any company in which the public has merely an indirect interest and of the works carried out by which the public can make no direct use. The Act cannot therefore be put into motion for the benefit of such a company as a spinning or weaving company or an iron foundry, for although the works of such companies are distinctly 'likely to prove useful to the public' (to use the words of Section 48), it is not possible to predicate of them 'the terms on which the public shall be entitled to use' them, a condition precedent to the acquisition of land laid down in Section 49. It is important both that the public should understand that the Act will not be used in furtherance of private speculations and that the local governments should not be subject to pressure, which it might possibly sometimes be difficult to resist, on behalf of enterprises in which the public have no direct interest."<sup>3</sup>

Three Constitutional Bench decisions of the Supreme Court in 1961 and 1962 decimated this difference. These cases are *Pandit Jhandu Lal and Others Vs. The State of Punjab and Another* (AIR 1961 SC 343); *R.L. Arora Vs. The State of Uttar Pradesh* (AIR 1962 SC 764); and *Smt. Somawati and Others Vs. State of Gujarat* (AIR 1963 SC 151).

In *Pandit Jhandu Lal and Others Vs. The State of Punjab and Another* (AIR 1961 SC 343), the agricultural land of farmers was taken away for

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3. Proceedings of the Council of the Governor General of India: Gazette of India, Part VI, 12/03/1892, pp. 25 at p. 28

the construction of houses for the workers of a company under a government sponsored housing scheme. No attempt was made by the government to comply with the requirements of Part VII of the Act. Holding that the construction of residential quarters for industrial labourers is a public purpose and noticing that a large proportion of the compensation money was to come out of public funds, the Supreme Court began the obliteration of the difference between Part II and Part VII in the following terms: "In the case of an acquisition for Company simpliciter, the declaration cannot be made without satisfying the requirements of Part VII. But that does not necessarily mean that an acquisition for a Company for a public purpose cannot be made otherwise than under the provisions of Part VII, if the cost or a portion of the cost of the acquisition is to come out of public funds. In other words, the essential condition for acquisition for a public purpose is that the cost of the acquisition should be borne, wholly or in part, out of public funds. Hence, an acquisition for a Company may also be made for a public purpose, within the meaning of the Act, if a part or the whole of the cost of acquisition is met by public funds."

There was a fight back in *R.L. Arora Vs. The State of Uttar Pradesh* (AIR 1962 SC 764). In that case agricultural land was acquired for an industrialist in Kanpur for the construction of a textile machinery parts factory. No action was taken under Part VII. Though this decision is generally favourable to the person opposing acquisition, a complication was created by the observations made in paragraph VI to the effect that the crucial determining factor was whether "the entire compensation" was to be paid by the corporation. Since the entire compensation came from the corporation, Chapter VII was said to apply and, since the procedures were not followed, the acquisition was set aside. It is no doubt true that there are some progressive observations made in paragraph XII to the following effect: "It seems to us that it could not be the intention of the legislature that the government should be made a general agent for companies to acquire lands for them in order that the owners of companies may be able to carry on their activities for private profit. If that was the intention of the legislature it was entirely unnecessary to provide for the restrictions contained in Ss. 40 and 41 on the powers of the government to acquire lands for companies. If we were to give the wide interpretation contended for on behalf of the respondents on the relevant words in Ss. 40 and 41, it would amount to holding that the legislature intended the Government

to be a sort of general agent for companies to acquire lands for them, so that their owners may make profits.”

The Court then dealt with the submission that the acquisition would come under Part II as the company was producing goods that were useful to the public and that, therefore, the acquisition was for a public purpose. The Court held: “It can hardly be denied that a company which will satisfy the definition of that word in S. 3 (e) will be producing something or other which will be useful to the public and which the public may need to purchase. So on the wide interpretation contended for on behalf of the respondents we must come to the conclusion that the intention of the legislature was that the government should be an agent for acquiring land for all companies for such purposes as they might have provided the product intended to be produced is in general manner useful to the public, and if that is so there would be clearly no point in providing the restrictive provisions in Ss. 40 and 41. The very fact therefore that the power to use the machinery of the Act for the acquisition of land for a company is conditioned by the restrictions in Ss. 40 and 41 indicates that the legislature intended that the land should be acquired through the coercive machinery of the Act only for the restricted purpose mentioned in Ss. 40 and 41 which would also be a public purpose for the purpose of section 4. We find it impossible to accept the argument that the intention of the legislature could have been that individuals should be compelled to part with their lands for the profit of others who might be owners of companies through the Government, simply because the company might produce goods which would be useful to the public.”

The Court concluded: “There is in our opinion no doubt that the intention of the legislature was that land should be acquired only when the work to be constructed is directly useful to the public and the public shall be entitled to use the work as such for its own benefit in accordance with the terms of the agreement which under Section 42 are made to have the same effect as if they form part of the Act.” In paragraph 21 of the decision, the Court gave the example of the construction of hospitals and libraries as works satisfying Sections 40 and 41<sup>4</sup> and held that agreements

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4. S. 40. Previous enquiry: (1) such consent shall not be given unless the appropriate government be satisfied, either on the report of the Collector under section 5A, sub-section (2), or by an enquiry held as hereinafter provided-

(a) that the purpose of the acquisition is to obtain land for the erection of dwelling-

have to be entered into so that the public may directly use such facilities.

The majority decision in *Smt. Somawati and Others Vs. State of Gujarat* (AIR 1963 SC 151) put the final nail in the coffin and whatever slim chances existed – for a pro-poor orientation of the statute – evaporated. This was a case where the government sought to acquire agricultural land for the purposes of setting up a factory for the manufacture of compressors and other equipment. The Punjab Government sanctioned the unbelievable amount of Rs. 100 for the purpose of acquisition. The require-

houses for workmen employed by the Company or for the provision of amenities directly connected therewith, or

(aa) that such acquisition is needed for the construction of some building or work for a Company which is engaged or is taking steps for engaging itself in any industry or work which is for a public purpose, or

(b) that such acquisition is needed for the construction of some work and that such work is likely to prove useful to the public.

(2) Such enquiry shall be held by such officer and at such time and place as the appropriate Government shall appoint.

(3) Such officer may summon and enforce the attendance of witnesses and compel the production of documents by the same means and, as far as possible, in the same manner as is provided by the Code of Civil Procedure, 1908 (5 of 1908) in the case of Civil Court.

S.41. Agreement with appropriate Government – If the appropriate Government is satisfied after considering the report, if any, of the Collector under Section 5A, Sub-section (2), or on the report of the officer making an inquiry under Section 40 that the proposed acquisition is for any of the purpose referred to in clause (a) or clause (aa) or clause (b) of Sub-section (1) of Section 40, it shall require the company to enter into an agreement with the appropriate Government, providing to the satisfaction of the appropriate Government for the following matters, namely:-

–the payment to the appropriate Government of the cost of the acquisition;

–the transfer, on such payment, of the land to the Company;

–the term on which the land shall be held by the Company;

–where the acquisition is for the purpose of erecting dwelling-houses or the provision of amenities connected therewith, the time within which, the conditions on which the manner in which the dwelling houses or amenities shall be erected or provided;

Section (4A) where the acquisition is for the construction of any building or work for a Company which is engaged or is taking steps for engaging itself in any industry or work which is for a public purpose, the time within which and the conditions on which, the building or work shall be constructed or executed; and

where the acquisition is for the construction of any other work the time within which and the conditions on which the work shall be executed and maintained, and the terms on which the public shall be entitled to use the work.

ments of Part VII were not complied with. It was contended, by the Writ Petitioners, that the token amount itself indicated that the acquisition had not been made for a public purpose, but for a company and ought therefore to be set aside since the procedure under Part VII had not been followed. The Constitutional Bench upheld the acquisition in the following manner: "We would like to add that the view taken in *Senga Naicken's case*, ILR 50 Mad 308 : (AIR 1927 Mad 245), has been followed by the various High Courts in India. On the basis of the correctness of that view the State Governments have been acquiring private properties all over the country contributing only token amounts towards the cost of acquisition. Titles to many such properties would be unsettled if we were now to take the view that '*partly at public expense*' means substantially at public expense. Therefore, on the principle of *stare decisis* the view taken in *Senga Naicken's case*, ILR 50 Mad 308 : (AIR 1927 Mad 245), should not be disturbed."

Subba Rao, J. set out a sterling dissent referring to Section 6(1).<sup>5</sup> He held that: "A reasonable construction of this provision uninfluenced by decisions would be that in the case of an acquisition for a company, the entire compensation will be paid by the company and in the case of an

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5. S. 6(1) Declaration that land is required for a public purpose – (1) Subject to the provisions of Part VII of this Act, when the appropriate Government is satisfied after considering the report, if any, made under Section 5A, Sub-section (2), that any particular land is needed for a public purpose, or for a Company, a declaration shall be made to that effect under the signature of a Secretary to such Government or of some officer duly authorized to certify its orders, and different declarations may be made from time to time in respect of different parcels of any land covered by the same notification under Section 4, Sub-section (1) irrespective of whether one report or different reports has or have been made whenever required under Section 5A, Sub-section (2):

Provided that no declaration in respect of any particular land covered by a notification under Section 4, Sub-section (1)- published after the commencement of the Land Acquisition (Amendment and Validation) Ordinance, 1967 (1 of 1967), but before the commencement of the Land Acquisition (Amendment) Act, 1984 (68 of 1984) shall be made after the expiry of three years from the date of the publication of the notification; or published after the commencement of the Land Acquisition (Amendment) Act, 1984, shall be made after the expiry of one year from the date of the publication of the notification.

Provided further that no such declaration shall be made unless the compensation to be awarded for such property is to be paid by a Company, or wholly or partly out of public revenues or some fund controlled or managed by a local authority.

acquisition for a public purpose the Government will pay the whole or a substantial part of the compensation out of public revenues. The underlying object of the section is apparent; it is to provide for a safeguard against abuse of power. A substantial contribution from public coffers is ordinarily a guarantee that the acquisition is for a public purpose. But, it is argued that the terms of the section are satisfied if the appropriate government contributes a nominal sum, say a pie, even though that total compensation payable may run into lakhs. This interpretation would lead to extraordinary results... The idea that in one case the compensation must come out of the company's coffers and in the other case the whole or some reasonable part of it should come from public revenues. This idea excludes the assumption that practically no compensation need come out of public revenues. The juxtaposition of the words 'wholly or partly' and the disjunctive between them emphasize the same idea. It will be incongruous to say that public revenue shall contribute rupees one lakh or one pie. The payment of a part of compensation must have some rational relation to the compensation payable in respect of the acquisition for a public purpose. So construed 'part' can only mean a substantial part of the estimated compensation."

He then concluded: "We think that the Legislature, when they passed the Land Acquisition Act, did not intend that owners should be deprived of their ownership by a mere device of private persons employing the Act for private ends or for the gratification of private spite or malice."

It may be noted that, at the time of enactment of the Land Acquisition Act 1894, the Second Select Committee, in its report dated 24.1.94<sup>6</sup> submitted to the Council of the Governor General of India explained the second proviso to the declaration under Section 6(1) in the following terms: "The object of the amendment we have suggested in the proviso to Section 6 is to enable land to be acquired under the Bill for the purposes of colleges, hospitals and other public institutions which are in some cases only partly supported out of public revenue or the funds of local authorities".

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6. Bombay Government Gazette Part VI, and dated 01.02.1894 pp. 18 – 29 : Gazette of India Part V, 27.01.1894 pp. 23 & 24.

## The second phase: Legislature fights back

The anguish of the legislature was immediately obvious. Shri S.K. Patil, speaking in the Lok Sabha<sup>7</sup> proposing the Land Acquisition (Amendment) Act, 1962, complained: "What happened after this Aurora case? After this Aurora case when the judgment was against those words, a similar case arose in Punjab only last month or 3 or 4 months back, in May. They had to acquire some land for air-conditioning. I do not know out of the two, machinery for textile or air-conditioning, which is a larger public purpose. According to me the first is. The textile machinery is surely a larger public purpose. Even then, I do not go into that but the Government saw that they were likely to be attacked if they acquired lands under Chapter VII or Part VII: Therefore, they were wise enough and they went to Part II. Part II puts no obligation on the Government of any type. Not only they could acquire, but they have got to pay some money. Therefore, do you know, how much they paid? They paid Rs. 100 for the land. Technically they have to pay some money. In the other Part, when it is acquired for a company, the money is to be paid wholly by that company. Therefore, in order to satisfy the requirement of law, they paid Rs. 100 and acquired the land for themselves which they have a right to do and then they gave it for the air-conditioning plant, etc.

The case went to the Court and this judgment of *Aurora versus the U.P. Government* was quoted in that court also and the judgment of the five judges of the Supreme Court said: 'Whatever it might be, once the state government, in its wisdom, acquires the land for a public purpose, its decision is final and unchallengeable. We have no right to challenge the decision of it, because the wording of Section 4 of Chapter II does give us any loophole that we might go through it and change the meaning of it. They are competent and the compensation is also not justiciable.' You can see.

"Therefore, we are trying to prevent these, that hereafter the state governments should not go to the length of acquiring land under Part II even for companies. Therefore, my friend opposite will see that I am restricting the law in order to take away the liberty of the states to acquire lands under Part II in which the final decision is only what they decide, and not as is given here and many other things might happen. Here I am making it under Part VII so that all those restrictive measures that have been put

7. Lok Sabha Debates, 3<sup>rd</sup> Series, Vol. 7, and dated 30.08.1962, cols. 5129 & 5130.

including the compensation should be applied to it and it should not be very easy for the State Government to acquire it for anything and everything. This is the distinction that is sought to be made.”

The proposal to amend the Act did not materialize and Shri S.K. Patil told the Lok Sabha that a more comprehensive Bill would be placed before the House. It took 22 years for the new amendment to be placed before the Lok Sabha.

On 6 August 1984, Bill No. 63 of 1984 was introduced in the Lok Sabha to amend the Land Acquisition Act, 1894. In the Statement of Objects and Reasons, it was set out that the “promotion of public purpose has to be balanced with the rights of the individual whose land is acquired, thereby often depriving him of his means of livelihood. Again, acquisition of land for private enterprises ought not to be placed on the same footing as acquisition for the state or an enterprise under it ... The main proposal for amendment are as follows:.. (ii) Acquisition of land for non-government companies under the Act will henceforth be made in pursuance of Part VII of the Act in all cases.”

Piloting the Bill through the Lok Sabha and the Rajya Sabha, the Minister Mohsina Kidwai said: “I would now like to draw the attention of the Honourable Members to some other provisions of the Bill ... The scope of the term ‘public purpose’ has been revised so as to provide for acquisition of land for all socially important purpose, but at the same time to obviate the possibility of misuse of this provision...”<sup>8</sup>

This is how the Act was amended and a new Section 3 (cc) was introduced; a new Section 3 (e) was substituted thus separating companies from government entities. The most important change came in 3 (f) where an exclusionary clause was introduced to the expression – “public purpose” – making it very clear that acquisition of land for companies was excluded from the expression “public purpose” in Section 3(f). For the sake of clarity, the Section is set out herein below:

3(f): the expression “public purpose” includes:

...

...

8. Lok Sabha Debates, 7<sup>th</sup> Series, Vol. 51 No. 24, dated 25.08.1984.  
Rajya Sabha Debates, Vol. 131, No. 26, dated 28.08.1984.



But it does not include acquisition of land for companies.”

It appears that, in some publications, the exclusionary rider is shown as a continuation of Clause VII above. However, in the Bill<sup>9</sup> – and in the subsequent gazette publications of the amended Act – the exclusionary rider is set apart from Clause VII and has a different intent showing that it is exclusion to the entire sub-section. This is the only way to read this exclusionary clause – by reading it together with the Statement of Objects and Reasons. The rider is correctly set out in *HMT House Building Cooperative Society Vs. Syed Khader* (1995 2 SCC 677) and *Jnanedaya Yogam Vs. K.K. Pankajakshy* (1999 9 SCC 492).

### Third Phase: Judiciary ignores the amendment

There are several decisions of the Supreme Court with regard to land acquisition done after the 1984 amendment. These may be divided into four categories. First, where the decision relies on pre-1984 judgments of the Supreme Court and do not notice the critical amendment in section 3 (f). The second are those decisions that reproduce Section 3 (f) incorrectly as if the rider is connected to Section 3 (f) (viii) alone. The third are those that correctly set out 3(f) and then proceed on the assumption that the amended section makes no difference at all. The fourth categories are those cases that correctly interpret the amended Section 3(f).

Dealing with the third categories of cases – in *Pratibha Nema Vs. State of M.P.* (2003 10 SCC 626) land was acquired under Part II for the establishment of a diamond park. The Supreme Court relied on *Smt Somawanti's Vs. State of Punjab*,<sup>10</sup> *Jage Ram Vs. State of Haryana*,<sup>11</sup> *Manubhai Jehtalal Patel Vs. State of Gujarat*,<sup>12</sup> *Indrajit C. Parikh Vs. State of Gujarat*,<sup>13</sup> *Bajirao T Kote Vs. State of Maharashtra*,<sup>14</sup> *R.L. Arora Vs. State of U.P.*,<sup>15</sup> *Srinivasa*

9. Bill No. 67 of 1982: Gazette of India (Ext.), Part II, Sec. 2, dated 30.04.1982, pp.

14 – 23, in the Bill No. 63 of 1984: Gazette of India (Ext.), Part II, Sec 2, No. 41, dated 06.08.1984, pp. 1-14, and also the Land Acquisition (Amendment) Act, 1984: Gazette of India (Ext.), Part II, Sec 1, No. 86, pp. 1-11, dated 24.09.1984, pp. 1-14

10. (AIR 1963 SC 151)

11. (1971 1 SCC 671)

12. (1983 4 SCC 553)

13. (1975 1 SCC 824)

14. (1995 2 SCC 442)

15. (AIR 1964 SC 1230)

*Co-op House Building Society Ltd. Vs. Madam Gurumurthy Sastry*<sup>16</sup> and *Pandit Jhandu Lal Vs. State of Punjab*<sup>17</sup> and upheld the acquisition, under Part II, in the following terms: "One thing which deserves particular notice is the rider at the end of clause (f) by which the acquisition of land for companies is excluded from the purview of the expression 'public purpose'. However, notwithstanding this dichotomy, speaking from the point of view of public purpose, the provisions of Part II and Part VII are not mutually exclusive as elaborated later". This observation is utterly wrong and the decision is in utter disregard of the amendment and deserves to be set aside by a larger Bench.

Each one of the decisions relied upon were in respect of pre-amendment acquisitions though the decisions may well have been rendered after 1984. The conclusion of the Supreme Court, in this case, is utterly retrogressive and is set out below:

Thus the distinction between public purpose acquisition and Part VII acquisition has got blurred under the impact of judicial interpretation of relevant provisions. The main and perhaps the decisive distinction lies in the fact whether the cost of acquisition comes out of public funds, wholly or partly. Here again, even a token or nominal contribution by the Government was held to be sufficient compliance with the second proviso to Section 6 as held in catena of decisions. The net result is that by contributing even a trifling sum, the character and pattern of acquisition could be changed by the Government. In ultimate analysis, what is considered to be an acquisition for facilitating the setting up of an industry in the private sector could get imbued with the character of public purpose acquisition if only the Government comes forward to sanction the payment of a nominal sum towards compensation in the present state of law that seems to be the real position.

The decision in *Somavanti's case*<sup>18</sup> – to the effect that even a nominal contribution by the government would convert an acquisition for a company into a public purpose acquisition under Part II – was taken to absurd levels in *Indrajit C. Parekh Vs. State of Gujarat*<sup>19</sup> where it was held

16. (1994 4 SCC 675)

17. (AIR 1961 SC 343)

18. (1963 2 SCR 774)

19. (1975 1 SCC 824)

that even a nominal contribution of Rs. 1 would validate the acquisition. Similarly – in *Manubhai Jehtalal Patel Vs. State of Gujarat*<sup>20</sup> – the Supreme Court held that “the contribution of Re. 1 from the public exchequer cannot be dubbed as illusory so as to invalidate the acquisition.” These utterly irrational decisions eventually decimated the crucial difference between acquisition for companies and acquisition for public purposes. This deplorable trend continued with Pratibha Nema’s case.<sup>21</sup> Thus, the explicit intention of the Parliament – not to permit state governments becoming agents for companies and misusing the Land Acquisition Act by pretending that acquisition of lands for companies was for a public purpose – was thwarted by the Supreme Court.

The fourth category of cases – though there was a feeble attempt by some Benches of the Supreme Court to restrict acquisitions for companies using the guise of public purpose – were very few and could be easily distinguished. In *Jnanedaya Yogam Vs. K.K. Pankajakshy*,<sup>22</sup> a registered society sought the intervention of the government to acquire land for a religious procession celebrating a festival in the Jagannath Temple. The Supreme Court held that such an acquisition would be governed by Part VII and would not fall within the definition of “public purpose” as defined in Section 3(f) of the Act.

In *Devinder Singh Vs. State of Punjab*<sup>23</sup> – where the State initiated Part II proceedings to acquire land for a tractor manufacturing company – the Supreme Court, after noticing the amended Section 3 (f), correctly held as follows:

When a request is made by any wing of the State or a Government company for acquisition of land for a public purpose, different procedures are adopted. Where, however, an application is filed for acquisition of land at the instance of a ‘company’, the procedures to be adopted therefore are laid down in Part VII of the Act.

Though the Court is shown the decision in Pratibha Nema’s case,<sup>24</sup> the Court declined to follow that ratio and held as under:

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20. (1983 4 SCC 553)

21. (2003 10 SCC 626)

22. (1999 9 SCC 492)

23. (AIR 2008 SC 261)

24. (2003 10 SCC 626)

Expropriatory legislation, as is well known, must be strictly construed. When the properties of a citizen is being compulsorily acquired by a State in exercise of its power of Eminent Domain, the essential ingredients thereof, namely, existence of a public purpose and payment of compensation are principal requisites therefor. In the case of acquisition of land for a private company, existence of a public purpose being not a requisite criteria, other statutory requirements call for strict compliance, being imperative in character.

The Supreme Court then relied on the decision of the Supreme Court in *General Government Servants Cooperative Housing Society Ltd. Agra Vs. Sh Wahab Uddin*<sup>25</sup> and concluded that Rule 4 was mandatory and Companies were required to negotiate with farmers and avoid acquisition of agricultural land. In that case, the Supreme Court held:

The above consideration shows that Rule 4 is mandatory; its compliance is no idle formality; unless the directions enjoined by Rule 4 are complied with, the modification under Section 6 will be invalid. A consideration of Rule 4 also shows that its compliance precedes the notification under Section 4 as well as compliance of Section 6 of the Act.

This decision, however, could easily be distinguished on facts as payment by the government for acquisition came after the Section 4 notification. It can, therefore, be argued that this was a case where the entire contribution for acquisition was to come from a company and that the subsequent payment by government was to cover up for what was essentially acquisition for and paid for by a company.

In *Chaitram Verma Vs. Land Acquisition Officer*,<sup>26</sup> acquisition was started for construction of a railway siding for a cement plant of TISCO. The High Court held:

The last part of the definition i.e. 'it does not include acquisition of land for companies' is important and brings out the obvious fact that even though a 'public purpose' may be served by acquiring land for companies, the expression 'public purpose' as used in the Act does not include such acquisition... But the use of ex-

25. (1981 2 SCC 353)

26. (AIR 1994 MP 74)

clusionary sentences at the end would make the difference and indicate that except for acquisitions for companies which cannot be treated as acquisition for public purpose, all other purposes are included within it... Under the circumstances whatever may be the extent of purpose included within the definition of 'public purpose' acquisition for company is excluded from it. Clearly, therefore, an acquisition for a company is to be distinguished from acquisition for a public purpose, and an acquisition for a company even though serving public purpose, cannot, in the context of S.3(f) of the Act, be accepted as an application for a public purpose... Legal position was different before the amendment of the definition in 1984 by Act No. 68 of 1984. The definition of 'public purpose' in S.3(f) of the Act before this amendment did not have any exclusionary clause and was inclusive. Similarly, S.4(l) of the Act permitted issue of notification only for a 'public purpose'. It was, therefore, possible to then submit that if 'public purpose' is served by a company, there would be no illegality in the acquisition for a company on the basis of notification mentioning acquisition for a public purpose.

In *State of Punjab Vs. Raja Ram*,<sup>27</sup> land was acquired for the construction of godowns for the Food Corporation of India. The acquisition was set aside in the following terms:

The Corporation being a 'company' compliance with the provision of Part VII of the L.A. Act had to be made in order to lawfully acquire any land for its purpose. It is not denied that such compliance is completely lacking in the present case.

### **The elitist approach: And how it was articulated**

The tilt towards corporations – and away from the poor – was legally articulated in the following way: (1) it was said that public purpose cannot be defined; (2) that benefit must come to some part of the population (not necessarily the vast majority of the poor; even the rich are part of the public); (3) that the doctrine of eminent domain gives the state vast powers to take people's land; and (4) the government is the best, if not the only, judge of what constitutes public purpose.

27. (1981 2 SCC 66)

This body of case law develops in a situation where the state is only too anxious to help corporations for kickbacks. Extensive corruption surrounds land acquisition proceedings. It is the lands of the poor that are invariably taken away. Rich farmers, and others, are able to adroitly avoid acquisition by political lobbying. It is in this situation that the courts develop a hands-off policy, thus inadvertently legitimizing the expropriation of the landholdings of small farmers to facilitate corporate profiteering.

What direction would the courts have taken if a government actually began appropriating the lands of rich farmers for genuinely socialistic purposes such as those of education and health. This remains a matter for speculation. It is entirely possible that a new jurisdiction would have emerged.

The decision, in R.L. Arora's case,<sup>28</sup> has conveniently been forgotten. The ratio – that public purpose should be directly useful to the public and the public shall be entitled to use the work as such for its own benefit – has never been followed thereafter. This was a pro-people interpretation of Section 3(f) of the Act. If rich persons and corporations wanted land for any purpose, it was open to them to buy land from the open market on the basis of negotiation with farmers. Only if land was required for a project – which was directly useful to the public and which the public could use as of right – would the Land Acquisition Act come into play. But this was not to be. An interpretation was given and followed for decades thereafter, which would allow for corporate takeover of agricultural land with no intervention whatsoever from the court.

In Somawanti's<sup>29</sup> case, the Supreme Court upheld acquisition – for a company manufacturing refrigeration compressors – and held that the said acquisition was for a public purpose. In *Jage Ram Vs. State of Haryana*,<sup>30</sup> relying on Somawanti, the Supreme Court upheld acquisition for a factory manufacturing China- and porcelain-wear. Thus, in Somawanti, in an action relating to the taking of lands of farmers, the Supreme Court set the bar so low as to make it almost impossible to challenge acquisition proceedings. The acquisition could only be challenged if it was "not a public purpose but a private purpose or no purpose at all." Thus, the courts could not play any balancing act between the stated public purpose

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28. R.L. Arora Vs. The State of Uttar Pradesh (AIR 1962 SC 764)

29. (1963 2 SCR 774)

30. (1971 1 SCC 671)

and the detriment to the public. Proportionality could not be assessed at all. After that everything under the sun met the standard of public purpose.

In *Sooraram Pratap Reddy Vs. District Collector*<sup>31</sup> the Supreme Court relied on the dissent in *R.L. Aurora's case*<sup>32</sup> where it was said, "I think it would unduly restricting the meaning of the word "useful" to say that a work is useful to the public only when it can directly be used by the public." Aurora's case was not followed by reference to a series of American decisions on the point that public interest need not mean that every member of the public should benefit. The American decisions were therefore not relevant at all.

In the same decision (*Sooraram*) reference is made to *Motibhai Vithal-bhai Patel Vs. State of Gujarat*,<sup>33</sup> (which was for the expansion of Sarabhai Chemicals as if this corporation could not buy land on the open market paying market rates!) where public purpose was seen in such a circular and indirect sense as to include savings in foreign exchange! The Court held, "That even if the acquisition of land is for a private concern whose sole aim is to make profit, the intended acquisition of land would materially help in saving foreign exchange in which the public is also vitally concerned in our economic system." On this logic, acquisition – for a tax-paying corporation – would also be in public interest, as the corporation would pay increased taxes on the transactions.

The legal logic, by which the superior courts began to allow all kinds of unkind acquisitions that caused untold misery to the rural poor, was that of adopting an almost complete hands off attitude in acquisition proceedings. In *Sooraram's case*, the Supreme Court held that "government is the best judge." In *Daulat Singh Surana Vs. Collector*,<sup>34</sup> the Supreme Court went to the extreme extent of holding that "government has the sole and absolute discretion in the matter." In *Dhampur Sugar (Kashipur) Ltd. Vs. State of Uttaranchal*,<sup>35</sup> the Supreme Court undercut its own role by saying that courts were "ill-equipped to deal with these matters", because acquisition cases dealt with complex social, economic and commercial matters.

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31. (2008 9 SCC 552)

32. (1962 SUPP (2) SCR 149)

33. (AIR 1961 Guj 93)

34. (2007 1 SCC 641)

35. (2007 8 SCC 418)

"It is not possible for courts to consider competing claims and conflicting interests and to conclude which way the balance tilts. There are no objective, justiciable or manageable standards to judge the issues, nor can such questions be decided on a priori considerations". This is a point of view that is completely untenable. The superior courts deal with complex commercial matters day in and day out. They draw a balance between competing interests. They lay down justiciable standards where none exist. For the Supreme Court to avoid adjudication of competing interests – in land acquisition matters – shows that the court was, by and large, in line with the government's policy of uncontrolled land acquisition.

At root lay the uncritical reliance on the doctrine of "eminent domain" which has its origin in the colonial period and which justified colonial land-grabbing all over the world. There is a sizeable and erudite body of literature situating this doctrine in imperial ideology and criticizing it for its use as a foundation for forcible acquisitions by the government – particularly of the lands of indigenous people. In Sooraram's case, the Supreme Court affirmed this obnoxious doctrine by reference to *Charanjit Lal Chowdhury Vs. Union of India*,<sup>36</sup> and followed it thereafter in a series of cases.<sup>37</sup>

## Conclusion

The judiciary appears to have misread the mood in the country, particularly after the 1984 amendment. Prior to that the mood of nation building probably made judges feel that development was not possible, unless acquisition was done freely and with public purpose given the widest possible scope. But to continue with such an approach in the period of globalization – where land acquisitions were done to promote corporate interests with the state becoming an estate agent of the companies – is quite another thing. To disregard, in the manner done, the intent of the 1984 amendment indicates how powerful the urge among industrialists – to grab the lands of farmers – was. As a result, large tracts of lands throughout the country, mainly of small farmers, have been forcibly acquired and

36. (AIR 1951 SC 41: 1950 SCR 869)

37. *Commr. & Collector Vs. Durganath Sarma* (AIR 1968 SC 394: 1968 1 SCR 561), (*Coffee Board Vs. CCT* (1988 s SCC 263: 1988 SCC (Tax) 308) & *Scindia Employees' Union Vs. State of Maharashtra* (1996 10 SCC 150))



people displaced. There were mass protests against displacement everywhere, but the superior judiciary remained unmoved, doggedly anchored to their notions of "development" unresponsive to the distress of farmers, tenants and agricultural labourers and the decline of agriculture. During this period of globalisation, from 1990 onwards, the Union Government withdrew credits from agriculture and followed conscious anti-farmer policies rendering agricultural production unremunerative. In this context, the compulsory acquisition of lands – using this draconian statute – was the cruelest blow of them all.

The way forward is for the judiciary to compel all acquisitions for companies to follow the Part VII route and to reverse the decision in Somawanti's case and hold that, irrespective of the contribution by government, all acquisitions for companies must follow Part VII. The reason for this approach is not difficult to comprehend. State governments today have come under corporate control so completely that they are only too eager to spend large sums of state funds to assist corporations in the acquisition of lands using the Act. The judiciary must understand that there is grave unrest in rural India and if it is to relate to the rural poor at all, it cannot go by the constitutional Bench's decision of the earlier period. Times have changed. The rural economy is in ferment. With rural ferment everywhere, the time has come for the Supreme Court to heed the dissent of Subba Rao, J. in Somawanti's case as set out above and the observations of the Supreme Court in *National Textile Workers Union Vs. P.R. Ramakrishnan*<sup>38</sup>: "We cannot allow the dead hand of the past to stifle the growth of the living present. Law cannot stand still; it must change with the changing social concepts and values."

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38. (1983 1 SCC 228)

# SIKKIM DAMS ON THE HORIZON

Kanchi Kohli

**T**oday's story goes back to 1998, when the Teesta river in Sikkim was the subject of an intense hydro-power debate. At that time the expert committee for River Valley and Hydro-electric Projects in the MoEF was in the process of granting approval to the 510 MW Teesta V Hydro-project to be constructed on the free flowing Himalayan river, Teesta. This approval was required as part of the procedure prescribed under the Environment Impact Assessment Notification (EIA). An initiative of the National Hydro-power Corporation (NHPC), this project was set to be the first of the six-stage "cascade" plan to harness 3,635 MW of hydro-power, all within 175 km of the river Teesta.

At the initial stage, discussions within the River Valley Committee were veering towards the view that the Teesta V project should be allowed to go ahead only after a comprehensive carrying capacity study of the Teesta river is carried out. The purpose would be to ascertain the load the river can actually take when it comes to social, ecological and environmental impacts. But, this never happened and approval to the Teesta V project was granted in 1999 following pressure from the Ministry of Power. It came with the condition that no other project in Sikkim would be considered for environmental clearance till the carrying capacity study was completed. Even as the Centre for Inter-Disciplinary Studies of Mountain and Hill Environment (CISMHE) in New Delhi began studying the carrying capacity of the Teesta, the processes for the grant of approval to the 1200 MW Teesta III project (another run of the river scheme) was initiated and approved by the Ministry of Environment and Forests (MoEF). In fact, the MoEF granted approval to five projects on the Teesta river basin, in violation of the condition prescribed for the Teesta V project. The CISMHE study, funded by the NHPC, took six years, from 2001-7, to complete.

In a parallel development, the Government of India announced a list of another ten hydro-power schemes for the river Teesta as part of Prime Minister Atal Bihari Vajpayee's initiative to boost power generation in the

country. It did not matter that the findings of the carrying capacity study were neither ascertained, nor articulated at this point of time.

This was also the time when several youths from Sikkim and the Affected Citizens of Teesta group took to streets of Gangtok and launched an unending *satyagraha*. Representatives of the Lepcha tribal community began an indefinite hunger strike to save Dzongu, their traditional homeland. It was one of the most inspiring campaigns and it received national and international attention. The Lepcha community, and their supporters, were deeply concerned about what would happen to the free flow of Teesta and how it would impact their identity. Apart from land acquisition, a crucial concern was of cultural erosion due to the influx of outside labour into this protected region once dam construction begins.

It was in October 2008 that the MoEF issued a letter to the Government of Sikkim that no activities related to dams (even investigations,) should be taken up North of the Chungthang region, home to the Lepcha, Bhutia and other communities. Whether this was in recognition of the *satyagraha* was not stated, but it was certainly a critical step forward. What the MoEF admitted was that their decision was in the light of the observation of the Carrying Capacity Study by CISMHE on the ecological sensitivity of the Teesta Basin in North Sikkim. MoEF asked the state government to scrap five projects – Teesta I (300 MW), Teesta II (480 MW), Bhimkyong (99 MW), Bop (99 MW) and Lachung (99 MW) HEPs – with a total installed capacity of 1077 MW.

But the tug of war continued between the Sikkim government and the MoEF. In January 2010, the Power Secretary of the Sikkim government attended a meeting of the Expert Appraisal Committee (EAC) on River Valley and Hydro-electric Projects set up as part of the environment clearance process. What is interesting is that the resource person for the Sikkim government, at this time, was P.G. Sastry, who was Chairperson of the EAC for River Valley Projects as late as 2007. Professor Sastry said that the carrying capacity study by CISHME was exemplary and the project developers were willing to take on board the concerns raised in the CISHME study. But the developers and Sikkim government were constrained by the decision of the MoEF to carry out exploratory work upstream of the Teesta, where they could gather additional data.

In February 2010, the EAC gave permission to Teesta I and II projects to conduct investigations based on revised location and parameters. As

the projects were close to the Kanchandzonga National Park, the Government of Sikkim was asked to take permission of the National Board of Wildlife (NBWL). In March 2010, EAC members visited Sikkim and were hosted by the government and, local activists allege, by the project authorities themselves. In April 2010, the remaining three projects in North Sikkim were allowed to carry out investigations. These were Lachung, Bhimkyong and Bop HEPs. In the judgment of the sub-group, that visited the sites of the above projects, Bop and Bhimkyong do not have any rehabilitation issues and the 10 km stretch of the tunnelled river is intercepted by several perennial streams.

Till then, the MoEF had stuck to its decision of not allowing any dams upstream, though the processes were pointing to the inevitable. In November 2010, the MoEF granted Terms of Reference (ToR) to Lachung, Bhimkyong and Bop HEPs to initiate EIAs which would set the ball rolling for procuring environment clearances. This was facilitated by the "optimization study", that the MoEF allowed, to ascertain the impact of all three projects. This was done so that the diversion structures/tunnelling could be minimized, environmental flow determined and so on and so forth. Survey and investigations were approved in September 2010 following this.

What all this means is that one has gone back to the pre-1999 scenario and opened the doors to hydro-power development in Sikkim's fragile ecology. The MoEF, which can at one stroke decide on "no-go" or "go slow" regions, has chosen to turn the picture on its head.

Courtesy: Civil Society

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<http://www.civilsocietyonline.com/apr11/apr1112.asp>



# NOT FOR SALE

## Resistance Against the Hydro-power Projects by the Tribal People of Lachen, North Sikkim<sup>1</sup>

Janica Anderzen and Dr. Doma T. Bhutia

**L**achen, a small village of around 3000 inhabitants in North Sikkim, is probably best known for its breath-taking mountains, dense green forests and the life-giving river Teesta. However, despite the exceptional natural beauty of the area, the every-day life of the villagers is replete with hardships. In addition to the extreme climate and an isolated location, the Lachenpas have been, slowly and gradually, cut off from their traditional sources of livelihood by the factors outlined below. The large hydro-power projects, planned to be constructed in Lachen, are threatening to uproot the villagers from their land. Only, this time the Lachenpas have had enough. They've decided unitedly to say a firm "no" to the corporate powers. This article is an attempt to shed light on their successful resistance, a community movement, which has gone almost unknown in Sikkim and outside the State till date.

### **Shrinking livelihood opportunities**

The Lachenpa, a group of Bhutia, lead a semi-nomadic life and have traditionally based their livelihood options on agriculture, animal-rearing and trading, with the latter being considerably limited by the closing of the border to China in 1962. Most families have cultivable land in which they grow potatoes, radishes and leafy vegetables during the summer. There's hardly any land for grazing or cultivation in the village itself which is why cattle, yaks and sheep are taken to Thanggu, or other areas close to Lachen, for fresh pasture. For the same reason, most of the cultivable plots are located outside Lachen.

The Lachenpas are known to be hard-working and many engage in

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1. Article is based on a field visit to Lachen in May 2011 during which several villagers shared their stories and concerns.

multiple occupations. Most are framers, traders of locally produced goods (agricultural products, raw wool, blankets, rugs, *chhurpi*, etc.) transport operators and tourist guides. Many villagers also run small hotels and guesthouses to provide accommodation for the increasing numbers of tourists in Lachen. Due to their economic and educational backwardness, only a few Lachenpas are working in government service.

Owing to the hard work and entrepreneurial spirit, the Lachenpas are surviving, regardless of the harsh conditions posed by the climate and geographical location. Yet, the future of the villagers is worrying, as their traditional livelihood patterns are under heavy pressure.

The most alarming issue is that of the loss of agricultural and grazing land to the Indian Army and the State Government. The Army has based camps close to Lachen and is holding large areas of cultivable land under lease, paying only a nominal rent to the landowners. Other cultivable lands have been seized by the State Government which has declared them as "forest land." In other words, the State Government has disregarded "traditional" land tenure and the Lachenpas are being punished for not having formalized individual rights to land in the past. As a result, villagers are deprived of large parts of land in which they have been grazing animals and carrying out agricultural practices for generations. Many villagers say they feel trapped given that there is hardly any more land left that can be used for agriculture or animal. Livelihood opportunities, of the Lachenpas, have been slowly narrowed down and many are facing difficulties in providing for their families.

## Saying 'no' to the hydel projects

In 2005, the Government signed a Memorandum of Understanding (MoU) with Himalayan Green Energy Pvt. Limited on the construction of Teesta I (320 MW), and the following year with NHPC Ltd. and Himurja Private Limited<sup>2</sup> on Lachen HEP (210 MW) and Teesta II (480 MW) respectively. The dam site of Lachen HEP is planned to be constructed within the radius of a few kilometres of the village just downstream of the confluence of Zemu Chu and Teesta river; Teesta II would

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2. Himurja Private Limited has incorporated M/s Himurja Infrastructure Pvt. Limited (HIPL) as the Special Purpose Vehicle, for execution and operation of the Teesta Stage-II H.E. Project (<http://himurjainfra.com/aboutus.html>).

be situated between Lachen and Chungthang (south from Lachen); and Teesta I, between Thanggu and Lachen (north from Lachen).

In 2006, a reunion was called in Lachen between the villagers, representatives from NHPC and government authorities concerned. It provided a space for all parties to share their views about the proposed hydro-power projects. The stand of the Lachenpas was clear: they articulated a firm “no” to any developmental project of any such kind on their lands. To reinforce the message the *dzumsa*,<sup>3</sup> under the tenure of *pipen* (*pipon*) Cho Rabjor, passed subsequently a resolution reflecting the democratic and unanimous decision taken by the villagers after deliberations amongst them. The resolution states that the Lachenpas are to oppose unitedly – now and in the future – any hydro-power project planned to be constructed on their land due to environmental, social and cultural factors.

Discussions with several community members, both women and men, during our field visit revealed that most villagers shared similar reasons and apprehensions for objecting to the hydel projects. The most oppressing concern was over the loss of land. Due to the Army and the State Government stripping the Lachenpas of vast land areas, they're left with limited alternatives regarding the terrain for agriculture and animal-herding. There is no place to go. They also pointed out that traditional livelihoods form a central part of their identity and a landless farmer is a paradox in a place like Lachen.

Related to the question of identity is the fear of an influx of migrant workers due to the construction work. The villagers said migrant workers would outnumber the local people which, in turn, would lead to unwanted demographic, social and cultural changes in Lachen.

The Lachenpas also raised deep concerns over the possible negative environmental impacts that the hydro-power projects would have on the rich biodiversity of the area, particularly on the endangered and endemic species and medicinal plants, which form an integral part of their way of life. They further explained that the fragile geography (e.g. frequent land

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3. Same as Lachung, Lachen doesn't have the panchayat system but *dzumsa*, headed by *pipen*, which is responsible for all developmental activities as well as social justice within the village area. It is a unique form of democratic governance in which all decisions are taken by consensus.



slides and sinking soil) makes the area unfit for mega hydro projects.<sup>4</sup> These, coupled with the adverse effects of climate change already impacting the Himalaya, would, in their view, make it a risky business to implement large-scale developmental projects in the area.

The *Carrying Capacity Study of Teesta Basin in Sikkim* (2006), commissioned by the Union Ministry of Environment and Forests (MoEF) and conducted by Centre for Inter-disciplinary Studies of Mountain and Hill Environment (CISMHE), agrees with the observations of the local people. It says: "Zones IV and V (Stages-I & II) have a higher number of breeding birds and exclusive species of taxa studied. Hence, any development project would endanger them. Also, Zones above III are geologically vulnerable, and anthropogenic pressures would lead to natural disasters."

In 2008, the MoEF reacted and issued a letter to the Government of Sikkim stating that no dam-related activities (even investigations) should be taken up north of the Chungthang region in North Sikkim. The MoEF asked the state government to scrap five projects - Teesta I (300 MW), Teesta II (480 MW), Bhimkyong (99 MW), Bop (99 MW) and Lachung (99 MW) – with a total installed capacity of 1077 MW. (Kohli 2011).

Unfortunately, as a result of persistency and persuasion by the Government of Sikkim, the Expert Appraisal Committee (EAC) on River Valley and Hydro-electric projects gave permission in 2010 to Teesta I and II projects to conduct investigations, based on revised location and parameters. Later, the same year, three other projects were also given permission to proceed with the survey and investigation. (Kohli 2011). A chart, prepared by the Central Electricity Authority (CEA), indicates that the Detailed Project Plan (DPR) for Teesta I is to be finalized by October 2012 and that for Teesta II by October 2011.<sup>5</sup> The expected year, for commissioning these projects, is 2016-17 and 2015-16, and 2016-17 for the Lachen project, states a brochure from the Energy and Power Department.

4. According to one villager, a representative of the NHPC had agreed on this in one unsuccessful visit to Lachen.

5. CEA chart states in the case of Teesta II: "Allotted to Himurja Infrastructure Pvt. Limited (HIPL). Earlier S&I [survey and investigation] stopped as the scheme was located above Chungthang area. Recently State Govt. has given permission to start activities. S&I have been started. (IIE Schemes Under Survey & Investigation, December 2010)

## Development contested

Many villagers criticised about the notion of development and widely promoted slogan "Clean and green Sikkim". They complained that development is flagged only when it serves someone else's economic interests. On other occasions, the grievances of the villagers are waved aside.

It is a valid remark in Lachen where there is no permanent doctor or a hospital. In an isolated village, which often becomes inaccessible due to weather conditions, countless pregnant women have lost their lives on the way to the closest town, Chungthang. The Lachenpas also shared another incident from 2009 about a major landslide which caused damage to several households. They claimed that no one came to assess the damages and no compensations were paid to the affected people.

The Lachenpas are Buddhist, but they also worship deities residing in the surrounding mountains and forests. The deities protect them from natural calamities and guarantee a good harvest. Rituals and *pujas* are performed to keep the deities happy and their permission is sought for any activity that might harm nature. The villagers are convinced the construction of the hydro-power projects would eventually destroy them, as the deities would become furious for disturbing nature's balance.

The Lachenpas have been offered abundant economic compensations for opening the doors to the hydel projects, but they are not willing to make compromises. Women, especially, pointed out that short-term economic benefits would not bring sustainable development to Lachen in the long run. The Lachenpas are not willing to sacrifice their nature, sacred landscapes and the future of the coming generations to feed an unsustainable lifestyle of those outside Sikkim (power generated by the mega hydro-power projects in Sikkim will mainly be exported to other states of India).

No money could ever compensate for the loss of one's identity, as one villager aptly pointed out. The Lachenpas wish to continue living peacefully in the land that feeds their body and soul, without fear of being uprooted from it.

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# AFFECTED CITIZENS OF TEESTA (ACT) FIGHTING THE GOJATHS

Dawa Lepcha

**T**he peak domestic energy need of the state is projected at approximately 80 MW by 2011. According to the White Paper, commissioned by the State Government on the Development of Hydro-power Resources of Sikkim, Sikkim has the hydro-energy potential of 8000 MW. This means that the rest of the power produced is for export. The State power policy risks endangering our environment, fragile ecology, aquatic life, peaceful indigenous socio-cultural existence and health. Hence, many Sikkimese from different communities, who have understood and felt that questions should be asked and explanations sought about these developmental programmes, have raised their voice, individually and collectively, since 1990s.

## **Brief background of anti-hydel struggles in Sikkim**

In the early 2000s, the proposal for 29 projects surfaced and the process for Letters of Intent (LOI) and Memorandums of Understanding (MoU) was begun. The general public was kept in the dark about the mammoth development programme and possible adverse effects were completely disregarded. The Sikkimese have slowly realized the possible repercussions of these projects. The public resentment against hydel projects dates back to the early 1990s, when the proposals for mega hydro-projects were first introduced in Sikkim. The first protest, though not on a large scale, was led by the Salvation Council of Dzongu against projects planned in the Lepcha tribal area, Dzongu. This was followed, a few years later, by a successful movement against the Rathong Chu project (70 MW) in West Sikkim by a group led by Buddhist monks called the Concerned Citizens of Sikkim. As a result of their persistence, the government scrapped the project even though crores of rupees had already been invested in it. Finally, the end of the decade saw a tepid fight against the Teesta Stage V project (510 MW) in East Sikkim.

The most significant and interesting form of resistance, sporadic voices of protest notwithstanding, is the anti-hydel stand taken by an indigenous group, the Lachenpa Bhutias, in North Sikkim. They have successfully warded off the hydel threat till date by uniting unanimously against the projects. Now even the people of their neighboring Bhutia village, the Lachungpas, have realized the ill-effects of these mega hydro-projects and have followed suit in protesting against the projects planned in their area, Lachung.

People's protests are not without reason. People have not been informed and consulted on these development projects. The projects are being imposed on the people, whether they want it or not, and without considering alternative developmental avenues. Furthermore, their lands are being snatched away by imposing draconian Land Acquisition Act, 1894. Their social, cultural and religious characteristics are disregarded. Environmental and ecological issues are ignored.

## **The fight begins**

One of the largest movements, against hydro-power projects in Sikkim, was launched by the Affected Citizens of Teesta (ACT) in the form of a hunger strike that went on for 915 days, with the following background.

Grassroots mobilization and awareness raising had been going on since late 2003. However, most people came to know about the anti-hydel protest only after the hunger strike started in June 2007. As in any other movement, it was not an easy task to convince people about the ill-effects of the hydel projects, since it was a completely new subject in the state. Another reason was that the companies and the government had their own devious means of convincing and luring illiterate, ignorant and innocent landowners.

The seed for ACT was sown towards the end of 2003 by Dawa and Pemzang at the latter's residence. Many others such as – Sherap, Tseten, Tsering Ongdup and Chopel – joined in shortly thereafter. Pemzang and Tseten had already been involved as President and Secretary, respectively, in the Joint Action Committee that had put up a fight against the Teesta V (510 MW) project. As the networking started, the numbers grew, although at a snail's pace. Efforts were made to bring the entire North Sikkim within the wider circle, but this was met with little success. Owing

to the lack of resources and response from other parts of the North, the team now concentrated on Dzongu, where seven mega hydro-projects were planned, covering the entire tribal area: 1200 MW Teesta III (the biggest project in the state), 520MW Teesta IV, 300 MW Panan HEP, 140 MW Lingzya HEP, 120 Rangyong HEP and Rukel and Ringpi with unknown MW. The latter four were situated inside Khangchendzonga National Park.

An ad hoc body was formed in August 2004 with Dawa Lepcha as the convener. This kick-started the process of village level campaigning in earnest. Awareness raising meetings were held in villages and hamlets, which often involved strenuous travelling. Village committees were formed and responsibilities shared. As a result, the number of members increased and many people, both young and old, joined. Finally in August 2005, the ACT was formed formally at a meeting in Dzongu, with Athup Lepcha chosen as the President. The anti-hydel movement picked up momentum with memorandums – opposing the hydro-projects submitted to authorities concerned – both at the state and federal levels of government, including the President and Prime Minister of India. Campaigns in villages became almost a daily activity. Sporadic confrontations – with company people and authorities – became a common feature. The press started taking notice. However, the companies kept making inroads with the support of the government.

A more drastic action was needed to raise the effectiveness of the protest. Hence ACT members made camp at Gangtok, the capital city of Sikkim, and went on a hunger strike with some members going on an indefinite fast for more than 60 days. The government did not respond initially. The Chief Minister (CM) prolonged his stay outside the state, for he had left when the hunger strike started. The political secretary to the CM visited the venue, but made only an indirect threat to the protestors, instead of talking about a solution. A 24 hour ultimatum was also issued to the protesters to remove the camp. They were told that action would be taken against them, if they refused to comply. However, the protestors stood their ground, along with other well-wishers who had joined them, to show their solidarity. No action was taken by the government.

The relay fast went on for 915 days in two phases: The first of 63 days by Dawa and Tenzing; the second of 96 days. Another member, Ongchu, sat for 81 days, during which he developed serious jaundice apart from

other complications. Several other members as well sat for weeks and some developed serious health complications. Tashi Namgyal Lepcha had to be put on oxygen.

Other groups that participated and deserve to be mentioned are the Concerned Lepchas of Sikkim, the Sanghas of Dzongu and the Sikkim Association for Environment. Their valuable support gave impetus to the movement and helped garner more energy and attention. The protest also received support from individuals, NGOs and the media not only in Sikkim, but also nationally and internationally. Medha Patkar, one of the most recognized faces in the anti-dam movement in the country, visited the camp and expressed her solidarity with the cause.

As a result of the relentless protest four projects – Rangyong, Lingzya, Rukel and Ringpi – were stopped in Dzongu and other five were stopped in other parts of the state (although the latter were later on granted permission to carry on with surveys and investigations). Furthermore, other projects in Dzongu have not, thus far, been able to start the construction since a lot of technical, environmental and legal irregularities, which otherwise would have gone unnoticed, have been exposed. If there had been no protest, the companies would have had an easy passage all the way and the projects would have started way back in 2005-6.

As a result of protest movements, studies and methods are being looked into by the project authorities concerned, which otherwise could well have been neglected. The movement has also helped in bringing to light the grievances of the affected people. Furthermore, the compensation, paid to those willing to sell their land, was tripled. The message is loud and clear – people are no longer going to accept things lying down.

Though the movement is currently not as visible, it cannot be written off. It can – and will – gain momentum any time as most dams are still far from being completed.

*–Dawa Lepcha is the General Secretary of Affected Citizens of Teesta (ACT) from Dzongu, North Sikkim. He is also a documentary maker who's recorded stories and testimonies of affected people by the hydel projects and captured ethnographic evidence in his area of origin*

# SANCTITY, ENVIRONMENT AND PROTEST: ALEPCHA TALE

Kerry Little

## January 2008, Dzongu Lepcha Reserve, North Sikkim

A young Lepcha priestess sits cross-legged before an altar with offerings of fruit, vegetables, flowers, *cí*, chicken and rice before her. She chants quietly, a thick curl of incense smoke swirling around her. The family of the house sit pressed against the wall – wide-eyed children on their mothers' laps. The priestess doesn't return the subdued gaze of her audience for her eyes are tightly shut. After a few minutes her voice rises and her chanting becomes faster. She cries out: "Where are they? Where are bows and arrows? I had asked you all to prepare them."

"Here they are," says a woman and places them by the priestess' side.

"I had asked you all to prepare them and they are ready. This is good. Father and mother be ready with your bows and arrows."

She clasps the bow and arrow by her side and her body shakes in line with her chanting. She throws rice at the altar. Then she grapples with the bow until she feels the arrow is in place. She circles the arrow above the offerings before throwing it at the altar. She calls a man. He kneels before her, receiving her blessings. She makes demands of him and he looks concerned. Her voice rises, assertive, instructive and insistent.

"You are father of land and vast family. You have no choice but to stand up for the cause. But you all, who are leading from the front, have not prepared your weapons. You have not listened to my bidding. It is shameful and sad. Now you are the leader, give me the day and time. I will take you men to the big forest. I will separate you all. You will have to make a pool of blood. You have to take and give life. Tell me fast when will you call me?"

"Two weeks", he replies. "We will let you know in two weeks."

"You will have to go to a big forest. I will choose you all. No women or girls should come. Only men. ...It has been months now, but nothing



much has happened, you are not heeding me. I have said what I have said. Still if you all are listless, then they will step all over you and all will not be well for the land [*sic*]. Be careful."

Lepchas call their priestesses, *Mun*, and their priests, *Bóngthing*. The *Mun* and *Bóngthing* have jointly looked after the interests of the Lepcha people right from the time of the Lepcha creation. They can communicate with the deities that, if not pacified, can heap mayhem and destruction upon the community.

The young *Mun*, in the house in the Dzongu Lepcha reserve in North Sikkim in January 2008, was asked to perform a ritual to protect those – opposed to the development of seven hydro-electric projects on their sacred homeland, Dzongu – from harm. Many were members of the Affected Citizens of Teesta (ACT) group and had long been fighting the government and large hydro corporations in a bid to have the proposed mega-dams in Dzongu cancelled. The Lepcha activists opposed the dams on many grounds: ownership, tradition, culture, religion and concern for the environment. The Lepcha *Mun*, through the deities that spoke through her, implored the activists to act with more assertiveness to protect the land. The spirits of the Lepcha chiefs – *Mensalong*, *Thekongtek* and *Aginthing* – spoke through her offering guidance and protection.

The activists draw heavily on their folklore and mythology to establish themselves as protectors of a sacred place. They talk frequently about the environment, biodiversity, their culture, their traditions and their "sacred" relationship with their land. Their protest narratives are environmental and sacred. They draw from the past and are created in the present.

This article looks at the "sacred" as a form of protest and political narrative in Sikkim as it applies to the current Lepcha protest in North Sikkim. It examines the activists' motivations in deploying their mythology and spiritual beliefs for the purpose of protest. I will discuss the Lepcha sacred protest narratives, but will first relate a similar protest movement in Sikkim that occurred in the mid-1990s. This protest was also about the sacred and was also about a hydro-electric project. It was a successful protest movement spearheaded by a small group of Sikkimese elite, was widely supported by the Lepcha and Bhutia communities of Sikkim and was carried out by the lamas from every monastery in Sikkim.

## The battle for Rathong Chu River

In July 1995, 500 lamas marched through Gangtok to protest the State Government of Sikkim's plans to build a 30 MW hydro-electric power station at the Buddhist sacred site, the Rathong Chu river, near Yuksom in West Sikkim. They carried banners pleading 'please protect our sacred land' and were followed by hundreds of Sikkimese women chanting prayers. The anthropologist Anna Balikci, who was doing her Ph.D. field work in Sikkim during the Rathong Chu protest, said:

*the movement began in earnest when the Dorje Lopen (abbot) of Pemayangtse monastery expressed his concern about the hydro-electric project and its consequences for Sikkim to Sonam Paljor Denjongpa... The Dorje Lopen told him that the project had to be stopped, but that he was now too old, his hands were tied, and it was time for the next generation to take over. When the Dorje Lopen passed away two days later, Sonam Paljor was left with the responsibility to carry out his wishes; he joined forces with Pema Namgyal and Chukie Tobden who together formed CSS – Concerned Citizens of Sikkim.<sup>1</sup>*

Therefore, this movement started in a religious place - a monastery, with an old lama entrusting the future of a sacred grove to a young lama. It was fought on the grounds that Yuksom is a sacred place for it is the first capital of Sikkim where the first King of Sikkim was crowned in the 17th century. The area is considered, by the Buddhist Bhutia and Lepcha communities, as the abode of Sikkim's protective deities. It is the site of Sikkim's most sacred monastery, Tashiding. Each year, the water from the Rathong Chu river is collected in a vessel and taken to Tashiding monastery for distribution to pilgrims during the annual Bumchu ritual – the holiest of Sikkim's festivals. The river is said to turn white and start singing.

The battle for the Rathong Chu river raged for two years from 1995-7. It was motivated by regard for the sacred and it was fought in the courts on environmental grounds. The protest narratives were on four key themes: history, religion, culture and the environment.

Concerned Citizens of Sikkim commissioned an artist to draw a "sacred" map of the Yuksom area which depicted the holy sites in West Sik-

1. Balikci A, *Lamas, Shamans & Ancestors, Village Religion in Sikkim*, Brill, London, 2008: 235

kim according to the "Neysol" text. The Neysole text is basically comprised of the religious prayer books of the Sikkimese Buddhists and is used for invoking the guardian deities of Sikkim. This map was published by the media and given to people with an interest in the project.<sup>2</sup>

P S Ramakrishnan, who was then head of Environment Studies at Jawaharlal Nehru University in Delhi, was commissioned to do an environmental impact study on the project. His findings were ground-breaking. He read the sacred map and gathered more information on the meaning of sacred places in Sikkim. "While Sikkim as a whole is considered to be sacred by Sikkimese Buddhists, according to the sacred text Nay Sol, the area referred to as Demajong, is the most sacred of all and the abode of Sikkim's deities. Interestingly the air, soil, water and the biota are all sacred to the people-because of the interconnections that they perceive to exist. Any human-induced perturbation is considered by Sikkimese Buddhists to spell disaster for Sikkim as a whole, because of the disturbance caused to the ruling deities and the treasures placed in the landscape," said Ramakrishnan.

He recognized the complexity and interconnectedness of sacred landscapes. "The Sikkimese sacred landscape is a unique case where ecological considerations cannot be separated from historical, social, cultural and religious dimensions." He recommended declaring the sacred landscapes as National Heritage Sites, then UNESCO World Heritage sites. He said: "Here is a sacred landscape where the people are truly integrated within the landscape unit itself, in a socio-economic sense."<sup>3</sup>

In 1994, a report, by Sikkim's State Ecclesiastical Department, stated that the "entire area of Yuksom is regarded as the 'most sacred' area of the State."<sup>4</sup>

On 8 June 1997, a major landslide hit Gangtok, killing 60 people and destroying many buildings. Lamas and Rinpoches said the landslide was an indication of the wrath and displeasure of the deities over the dam.

The project was eventually cancelled for political reasons for the Chief Minister, Pawan Chamling, early in his term with a slim majority, needed

2. I received a copy of this map in 2006 from Pema Namgyal, a member of CSS.

3. Ramakrishnan, PS, *Ecology and Traditional Wisdom, The Cultural Dimension of Ecology*. [http://ignca.nic.in/cd\\_07010.htm](http://ignca.nic.in/cd_07010.htm) (accessed 27 June 2010)

4. Quoted in *Sikkim: the Sacred Land*, Himalayan News Magazine, Hill people, Hill Media Publications, October 1995: 10

a popular “event” to gain the trust of the Bhutia-Lepcha community. He cancelled the project at the Gangtok football stadium in the presence of 5000 people.

### **The battle for Teesta**

While the Concerned Citizens of Sikkim were engaged in the fight for the Rathong Chu river, a 1200 MW dam was also announced for the Teesta River in Sikkim. It was objected to by the Dzongu Lepcha community, in particular, former Sikkim government minister, Athup Lepcha who said the project would uproot the people of Dzongu and that the Rathong Chu project “has defiled our holy places.” Following the cancellation of the Rathong Chu project, talk of the Teesta project in Dzongu died down. However, in 2004 dams in Dzongu were back on the government’s agenda.

A group of Lepcha youth from Dzongu, opposed to the dams, formed the Affected Citizens of Teesta – ACT – and asked Athup Lepcha to be its President. At that time there were six projects slated for the Dzongu Lepcha reserve. The seventh – 530 MW on the border of Dzongu at Dikchu – has been completed. In all, there are approximately 30 hydro-projects at various stages of development in Sikkim. The flagship protest by ACT was a two-and-a-half year relay strike in Gangtok and two long-term hunger strikes by, to begin with two and then three Lepcha protestors.

There were many similarities between the Teesta and the Rathong Chu protest movements a decade ago. The protest narratives are along similar themes. Both movements spoke of the sacred and expressed concern with issues of culture and environment. Today, however, the political climate is quite different. Pawan Chamling is still Chief Minister, but he is much stronger politically now than he was back then in 1995. In 1995, he held just 19 seats in the Sikkim Assembly, now he holds all 32 seats. Dzongu’s MLA has also changed. The MLA, in 1995, was Congress member Sonam Chyoda Lepcha who opposed the Teesta project. The current MLA – Sonam Gyatso Lepcha – is with the ruling SDF party and is also the Power Minister of Sikkim. He is not only a defender of the projects, but is also a strong and influential enabler. The current battle is focused on the 280MW Panan project.

The Lepcha narratives – that concern the sacred – contain the threat of what will happen if the land is disturbed. One of these places is the Kanc-

hunjunga National Park at Tholung in Upper Dzongu. There is a sacred cave above Tholung Gumpa where the Guru Rinpoche is believed to have spent many days. The stories of Tholung are part of the protest narrative of the Lepcha activists and form a core area of the argument presented to the government.

Athup Lepcha, in a letter to Sikkim's Chief Minister, attempted to communicate the spiritual significance of Tholung Gumpa. He spoke of the relationship between the late Sikkimese king Gyurmed Namgyal and the Lepchas of Dzongu. He relayed several stories to that effect. One story related the devastation of the village of Gor because the deities at Tholung had not been presented with the annual offering.

"So the residents of Gor did not participate in the Pang Lhasol function at the Tholung gumpa as prescribed even though it was their turn to make the offerings. After two months there was a plague at Gor which killed nine persons within a week ... realising their misdeed and disrespect to the deities and the late king, they rushed to the gumpa with offerings ... instantly the plague disappeared."<sup>5</sup>

In the same letter Athup Lepcha cited Guru Padmasambhava's ominous warnings of the imminence of danger and devastation, if the government insists on going ahead with the projects.<sup>6</sup> He spoke of the accuracy of Guru Padmasambhava's prophecies, citing actual sayings that had come true. The Guru had accurately foretold the coming of Tibetans to Sikkim to spread the cause of Buddhism. Guru Padmasambhava had prophesied that the man, born in the year of the mouse, would be the first king of Sikkim. He also said that the 11th king would be born in the Dragon year and concluded the prophecy with the warning that if a Tibetan, born in the year of the Pig, becomes the 12th king, he would be the last. All of this has come true. Then, after more proof of prophecies and the acknowledgement – that the Chief Minister had obtained the "rarest merit" by building a statue of Guru Padmasambhava at Samdruptse, which was sanctified and consecrated by His Holiness the Dalai Lama and His Eminence the Doderupchen Rinpoche – came a veiled warning:

*...in the land blessed by the Guru, [the Chief Minister] may kindly not in-*

5. Letter from Athup Lepcha, President ACT to the Chief Minister of Sikkim, 16 August 2007 p. 3-4.

6. Guru Padmasambhava is also known as Guru Rinpoche and Guru Padmakara.

*volve himself in activities to cause destruction of beings which cannot express their sufferings. Let us not forget Guru Padmakara's prophecies relating to Sikkim, Nepal and Tibet. We have a few more prophecies of guru relating to Sikkim, but we reserve the disclosure of them at this point in time.*<sup>7</sup>

The public narrative of Dzongu – as a sacred site for the Lepchas – has gained popularity since the advent of the hydro-projects. This protest movement – like the earlier Rathong Chu river protest movement – involved the lamas. However, ACT also consulted and involved the *Bóngth-íng* and *Mun*. There have been tragic incidents, relating to the projects, which serve to reinforce the belief of the Lepcha activists – that the deities are angry.<sup>8</sup>

In September 2001, the Sikkim government published a Notification documenting all sacred places of worship and institutions in Sikkim, which are a century old or even older. It is puzzling that there are no rivers on the list even though the Teesta River is a well known sacred river in Sikkim. The second-most sacred monastery in Sikkim, Tholung, is also not on the list. But putting that aside, there are 48 sacred places listed and the notification states that the State Government does hereby ban the scaling of the sacred peaks and also the defilement of the sacred caves, sacred rocks, sacred lakes, Chortens and sacred hot-springs as notified. It was signed by the Chief Secretary.<sup>9</sup>

If I were to take the list and mark the sacred places on a map of Sikkim, there would be several official sacred sites in every district. If I was then to overlay that image with the list of the 30 hydro-projects there would be projects in every “officially sanctioned” sacred place.

Balikci noted:

*When wrong actions are performed against the environment, the agents ritually identified as performing these are often outsiders in competition for natural resources, whether it be land, timber or hydro-power. Through the intervention of the supernatural, these agents are identified as the cause of illness and other misfortunes, and may ultimately be perceived as a threat*

7. Letter from Athup Lepcha, President ACT to the Chief Minister of Sikkim, 16 August 2007 p. 6-7.

8. These events were reported in Sikkim media. Another reference is [www.weepingsikkim.blogspot.com](http://www.weepingsikkim.blogspot.com)

9. *Sikkim Government Gazette*, Saturday 29th September 2001, No. 355 Notification dated 20.9.2001.

*to the survival of the villagers or even of the Lhopo community as a whole.*<sup>10</sup>

## The wrath of the deities

In every Buddhist household, and in every monastery in Sikkim, there is at least one, most likely several images, of Guru Padmasambhava, the patron saint and protector of Sikkim and teacher of Mahayana Buddhism. Guru Padmasambhava introduced Buddhism to the Lepchas, but he was unable to bring them to the Buddhist fold by way of religious conversion. It was several centuries before the Lepchas fully embraced Buddhism and, their own priests and priestesses, the *Bóngthing* and *Mun* continued to be the spiritual guides in Lepcha communities. When Sikkim did become a Buddhist kingdom, Guru Padmasambhava's teachings were – and continue to be – practiced alongside Lepcha rituals with the *Bóngthings* and lamas, in some circumstances, jointly conducting ceremonies.

I turned to Athup Lepcha for understanding the collusion between Guru Padmasambhava's teachings and the practice of the Lepcha *Bóngthings*. Athup fervently believes that the protective deities of Sikkim have been angered by the dam construction in the state.

In the cramped office, used by ACT in the basement at BL House, we met and examined a framed *Rigzin Tsa-Sum* thanka. The thanka is well known to every Buddhist in Sikkim and possibly also to every Sikkimese person; the imagery is so vivid. Athup held up the thanka: "Let us see if I can explain it to you or not," he said. "I'll try."<sup>11</sup>

The thanka was vividly painted and depicted demons, deities, lamas and the Guru in the centre. It was painted in the style of other Buddhist thankas. Athup explained who the deities were and their role in Guru Padmasambhava's journey in Sikkim. He was obviously not discussing Buddhism alone. He was talking about the culture of Sikkim at large. He pointed to each of the demon-like deities and explained that 128 treasures of Padmasambhava have been hidden in Mayel Lyang and that these deities have been engaged to look after these treasures. Athup traced the images on the thanka with his finger:

*Over here you see this is Padmasambhava, he is in another form, not in*

10. Balicki A, Lamas Shamans & Ancestors, Village Religion in Sikkim, Brill, London, 2008:239

11. A thanka is a buddhist religious painting

*this form, this is our deity who looks after the sacred land, she looks after sacred lakes. Now these here are the monks who established the kingdom, here is the first king of Sikkim, now these are the ten deities, this is Junga, his palace is Khangchendzonga; here is Bishu Karma, and this is Yeshe Goenpo, wisdom protector. They are deities, not Buddhas. This is Srinpo Lanka-Dengchu he's got ten heads; this is Naga. This is Thanglha, Chumbi Valley – Chumbi once belonged to Sikkim. When you are coming up from Siliguri to Sikkim, near hydro-project, this deity is there. This is Mamo. They are the main deities.*

*Over here we have the local deities, Tashiding Monastery, Pemayangtse monastery, Enchey monastery, Tholung monastery, there are certain lamas appointed to offer something for these deities, daily. They need offering to these deities but not by Tibetans.*

The deities don't respond to offerings by foreigners and can be angered by the intervention of outsiders. Athup related a story about the late 16th Karmapa from Rumtek monastery in Sikkim who was of Tibetan origin and who had no success with the Sikkim deities.

"He told me, 'these deities are very ferocious, they do not listen to me, the more I try to pacify them; the more they become ferocious.' So they listen only to the local lamas, not the foreigners [sic]."

I asked Athup if the government had listened to his warnings relating to the anger the dams had caused the deities.

"There was no reaction, why should they react? They don't understand, they don't know who our deities are, they don't know and they don't care about them," he replied.

On 12 February 2010, the Chief Minister of Sikkim said in a speech to other Northeast state leaders:

*All the North Eastern States are rich in natural wealth, rich biodiversity, flora and fauna with all the climatic zones. Now it is necessary that the people of the region in coordination with the Central Government devise some competitive mechanism to transform the North East into the richest zone. The only issue that we must pursue is development of the region.*

He then, somewhat incongruously followed this statement with ...

*We are also the custodian of the Himalayan eco-system ... more than 30 percent of all biodiversity reserves of the country perhaps is housed in the*



*North East and also recognised as a biodiversity hot spot. We also have rich reserves to help the nation in terms of overall production of energy in different ways.*<sup>12</sup>

The Lepcha activists of Dzongu still hold hope that they will be able to protect their land. They have stopped four of the six projects that were located within the biodiversity hotspot of Khangchendzonga National Park. This is the same biodiversity hotspot that the Sikkim's Chief Minister refers to when he talks about "rich reserves" and "production of energy."

When I was last in Sikkim in 2010, I spoke to Chotol Lepcha, a lama and religious painter from the Lingthem monastery in Upper Dzongu. The Lingthem monastery will have a 10 kilometre tunnel built under it if the Panan project proceeds and Chotol has spent more than two years protesting against the projects. He moved from Dzongu to ACT headquarters at BL House in Gangtok, the site of a relay hunger strike, where he conducted a ritual twice a day at 7.00am and then at 4.00pm to ask the local deities to protect Sikkim from the dams. Chotol believes that they will not be able to offer prayers once the power developers take all the good land away, rendering them landless. He said: "If we can't perform religious puja, the deities will get angry and destruction will come to the world."

The Lepcha protest has some things in common with other Indian protest movements: government lobbying, grass roots support, rallies, court action and hunger strikes. Each of these actions has the underlying Lepcha belief that their land is sacred. ACT secretary, Dawa Lepcha (who was twice on hunger strike for 63 and 96 days respectively) pointed out that the Environmental Impact Assessment of the Panan project should have included places of religious importance and structure, but that they were not mentioned:

*"The hills, mountains, springs, rocks, lakes, rivers are propitiated by the Lepchas of Dzongu, but they have all been utterly disregarded by the people who did the EIA. The Teesta stage IV will be destroying the Tingkyong lake, which is the originating place of two Lepcha clans the Hee-Yongmingmo*

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12. Keynote Address delivered by the Chief Minister, Pawan Chamling at the Summit of the North East MP Forum, Gangtok, February 12, 2010. Full text was published in *Sikkim Express*, February 13, 2010, p.4

*and the Turyeomoo ... The lake is also the home of a rare fish called Denggnu leek ... believed to be the living original form of the clans from which they took the human form. Hence, the belief is that should this fish perish the clans will also perish," he said.*

Ramakrishnan stated: "Sustainable development has to be considered in the context of the ecological framework within which the system operates."<sup>13</sup>

Many agree that environmental history needs an interface with scientists who can help build a new paradigm for the future. In company with (or "taking inspiration from") the Lepcha community of Sikkim, I would like to respectfully ask that culture – and traditional wisdom – also be seen as vital parts of that new paradigm.

*–Kerry Little is an Australian writer and Ph.D. candidate at the University of Technology, Sydney. Her work involves recording traditional and contemporary Lepcha stories and examining how modernity and globalisation has impacted on Lepchas' connection to their traditions.*

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13. Ramakrishnan, PS, *Ecology and Traditional Wisdom: The Cultural Dimension of Ecology*. [http://ignca.nic.in/cd\\_07010.htm](http://ignca.nic.in/cd_07010.htm) (accessed 27 June 2010)



# GLOBAL VOICES

## Temacapulin – Fighting to Survive

Carmen Díaz Alba

In Mexico, in the state of Jalisco, three small towns have been threatened by the construction of a new dam. The government, through the National Commission of Water (CONAGUA), plans to build the El Zapotillo dam on the Verde River, in the heart of the “Altos de Jalisco” region. It will supposedly store 912 million cubic meters of water, mostly for the city of Leon, Guanajuato. The dam would affect a surface of 3,800 acres of great environmental richness and agricultural production and three communities: Temacapulin and Palmarejo and Acasico.

Since the announcement of the “El Zapotillo” project in 2005, the communities have been expressing anger and dissatisfaction at not having been consulted previously and for being denied basic information about the project. They have begun to protest, but the authorities have not listened to their demands. The people of Temaca wish to reject this project because it will mean that their history, culture, homes, territory and sacred places will be submerged. The dam – that will be useful only for twenty five years – would destroy the natural flow of the river Verde and wipe out the towns that are part of Mexico’s cultural and historical patrimony. Temacapulin is recognized as a historical construction, subject to specialized conservation and restoration. Nevertheless, the government says the project will go on and has offered to move “stone by stone” the 250-year-old church. Of course, Temaca people have refused this and stated that “14 centuries of our town’s history and thousands of years of a river’s life shouldn’t be destroyed for 25 years of a dam’s use.”

This dam will also affect a large zone of the “Altos de Jalisco” region, used for agriculture. The water, that flows through the canyons of the Verde River, would lessen significantly, rendering this area arid and desiccated. In June 2011, the United Nations Special Rapporteur, on the Right to Food, Olivier De Schutter, visited Temaca and concluded that relocation would severely compromise agriculture and access to food.

Government authorities have shown disrespect towards the people of Temaca and have tried to promote disharmony among the people to suit their nefarious ends. They have coerced people into accepting relocation. The Human Rights State Commission has asked the authorities to suspend the construction and stop harassing the communities. One public official stated in 2008 : "either you leave or you drown... we are going to buy you life-jackets, so don't worry."

They are planning to construct the dam without taking detrimental environmental considerations into account. The governor of the state said that the dam would not be built if fifty percent of the population plus one opposed the dam. The official consultation never took place. However, Temacapulin decided to carry out a communitarian consultation in January 2011; ninety-eight percent of the people opposed the dam.

In October 2010, Temacapulin was chosen to host "Rivers for Life: the 3<sup>rd</sup> International Meeting of Dam affected People and their Allies."<sup>1</sup> Around 500 people from all over the world gathered to discuss, exchange and plan strategies to strengthen the movement against dams and to express solidarity with the affected communities.

In March 2011, the community decided to carry on a non-violent direct action plan and closed the construction site for one week. The government finally agreed to dialogue but, after a few weeks, in May 2011, the National Water Commission closed the door for any negotiations, stating that the Zapotillo Dam would be built, no matter what. Despite this, women, men, children and the elderly have decided to fight for their rights and defend themselves against this injustice. The people of Temaca have decided that their land is not for sale and will defend it with the solidarity of the international movement against dams, pro-rivers and human rights.

*- Carmen Diaz was part of the organizing team of the "Rivers for Life: the 3<sup>rd</sup> international meeting of dam affected people and their allies", and worked for the past two years in a human rights NGO, IMDEC (Mexican Institute for Community Development). She's currently teaching on social movements and collective action at ITESO University in Guadalajara, and is allied with the Comité Salvemos Temaca ('Save Temaca Committee').*

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1. Dawa Lepcha from ACT participated in the meeting.

# TESTIMONIES

## Independent People's Tribunal on Dams, Environment and Displacement

Singtam

1. Bhim Prasad Nepal, Singbel, E.S., Age : 65 years, retired BSF, Farmer, 9 members in his family, 6 hectares of cultivable land at Makha village. Approx 70 households in his village. Dam: Teesta Stage-V. Company: NHPC. Mr. Nepal formerly worked as a farmer, but is now retired. He owns around 6 hectares of land that is largely dry. He stated that when the NHPC initially came into the area, they promised a myriad of things: grocery stores, malls, improvement to schools etc. Yet none of these promises have materialized. Due to blasting, for construction of tunnels, he has suffered: (1) fractures to his home with ceilings, floors and wall foundations severely cracked; (2) drying up of his water source; (3) water crisis resulting in no crops; and (4) inconsistent access to electricity. Mr. Nepal filed an RTI application on the list of persons that have received compensation due to construction. Government sent a letter stating that the original letter, provided by the government, had a "typo" and the actual cost of construction and compensation was significantly lower than the originally cited amount. He also noted that he had to pay Rs 35,000 for files obtained via RTI. He further stated that his daughter (Laxmi Nepal, 29) has been working as a sub-contract employee for NHPC for the past 10 years and has no contract or status with the company. Mr. Nepal has not received any compensation.
2. Puspa Lal, Age: 70 years old. Dam: Teesta Stage-V. Company: NHPC. He owns about 16 hectares of land and works as a farmer. Impact of dam construction includes: (1) drinking water has dried up because of tunnel construction causing drying of small streams; (2) cracks in home (wall, ceiling, floors); (3) affected his crops, prior to construction, he was able to cultivate paddy, maize, and dahl, now only maize. He noted that the soil is "shrinking." He has not received any compensation because he is not considered an "affected" family as his land

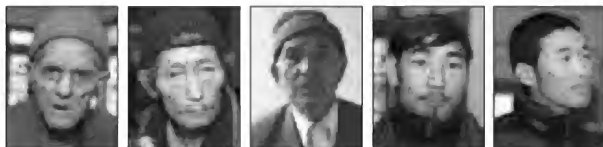
was not acquired by NHPC. The government does not view tunnel construction under homes as warranting compensation because the land is not "acquired" even though construction has negatively impacted his land, access to water and livelihood. He has gone to the District Collector and to the Panchayat on this issue, but nothing has happened. He stated that there are around 100 homes in Singbel, and around 70 homes in Maca.

3. Ganga Prasad Poudel, Age: 75 years. 11 family members. Dam: Teesta Stage-V. Company: NHPC. Mr. Poudel owns 7 hectares of land and works as a farmer. Impact of dam construction: (1) cracks in home (ceilings, floors and walls); (2) water has dried; (3) unable to cultivate paddy due to drought; (4) drinking water severely affected with NHPC dumping "cement water" and "mobile waste" into a small canal that directly goes to the local people; and (5) soil damaged. Mr. Poudel approached the District Collector. He has not received any compensation.
4. Jung Bahadur Chettri from Singbell village, E.S., Age: 71 years, 13 members in his family. He is a farmer and owns 5 hectares of agricultural land. Dam: Teesta Stage-V. Company: NHPC. Impact: (1) drying of water due to tunnel construction; (2) reduced access to electricity (only receives about 2 hours of electricity per day); and (3) house damage (fractures to ceilings, walls, floors). Mr. Chettri has been very active on the issue. He wrote a complaint to the NHPC stating that tunnel construction had affected his home and the NHPC responded saying that there was no liability on their end and that damage had been caused on account of the rains. A group of community members formed a steering committee in 2005, after meeting with the MLA, but nothing has happened. He noted that the tunnel is 18 km long, even though he has a document from Delhi stating the approval is only for 5 km radius of power. The tunnel runs far beyond that. Mr. Chettri filed an RTI application saying that several people had re-



ceived compensation due to construction and noted the inconsistent and arbitrary manner in which the compensation had been disbursed. He received a small amount of money for damage done to his home, but it was not enough and he has had to supplement the same with his own funds. He is looking for justice.

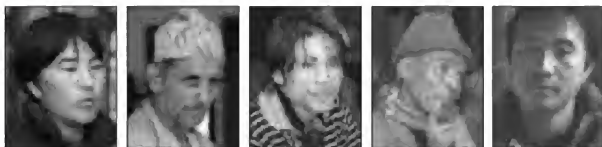
5. Dilliram Limbo, Age: 52 years, farmer from Darap (West) village. 5 members in his family. He owns seven hectares of cultivable land. Dam: Project Rangeet. Company: Gammon India Hydel Power Project. Mr. Limbo owns 7 hectares of land and works as a farmer. Construction on the Rangeet river has just begun. A public hearing was held in Peling, a village about 6 km from Darap; 70 people showed up in opposition to the construction. Although 70 community members attended the hearing, Mr. Limbo claims that, because of the location, many people couldn't reach or didn't know of the hearing. The hearing was not conducted properly and community members were promised that a re-hearing would be conducted. However, this was never done. Unfortunately, the original objections were not provided in writing. Impact of dam: (1) water is drying on the land; (2) village getting restructured; and (3) water crisis will impact crop yields, including cardamom which is the cash crop of the region. Impact is preliminary in nature, because construction has not begun yet. Mr. Limbo noted that the complaint, with related documents, was submitted to the State Pollution Control Board. The Board was informed that the community was fearful of the impact potentially caused by the construction. They were thus wholly opposed to its construction. A complaint was also submitted to the District Collector. Community has also sent letters to the President, Prime Minister and Chief Minister informing them of the community's objection to the dam and have requested government intervention.
6. Krishna Bahadur Chettri, Age: 56 years, from Darap village in West Sikkim. Six persons in his family and he owns one acre of land. Project





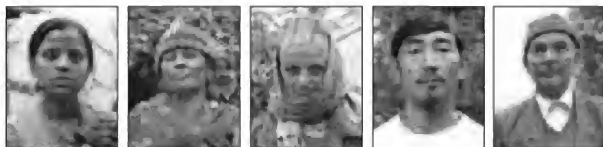
Rangeet. Company: Gammon India Hydel Power Project. Mr. Bahadur is a daily wage labour. He noted that due to tunnel construction, an overflow of water is draining into a "pit" which houses company waste. His house is located about 15 meters from the tunnel construction. The house is on a slope and, because of the pit and drain under his home, the soil underneath is beginning to slide, causing damage to his home. He testified as to the impact of the drain on his home (cracks in foundations) and is concerned that, with impending tunnel construction, his house will suffer a significant damage. Noted that there are around 600 homes in Darap.

7. Deoraj Chettri, Age: 70 years, Darap, W.S. 6 family members. Project Rangeet. Company: Gammon India Hydel Power Project. Owns two hectares of land. Mr. Chettri is fearful that if the tunnel is constructed, the water will dry up, impeding access to safe drinking water and water needed to cultivate the land (specifically dahn). Tunnel is 20 m from his home.
8. Jit Man Subba, Age: 61 years, Darap, W.S., nine family members. Project Rangeet. Company: Gammon India Hydel Power Project. Owns 7 hectares of land, house is 20 m from tunnel. He is worried about the fact that tunnel construction will result in drought, impact his ability to cultivate the land and impede access to safe drinking water.
9. Tashi Namgyal Lepcha, Age: 35 years, Dzongu, N.S., four family members. Owns five hectares of land and works as a farmer. Dam: Panang Hydel Project, 280 megawatt, Company: Himagiri Hyderabad. Impact: (1) destruction to home; and (2) reduced access to water. Stated that the vibrations from drilling near the mountain, close to their village, has caused wildlife to flee, disrupting biodiversity. There are around 45 homes above the powerhouse and construction will wreak havoc upon them. There are five villages above the tunnel, which is eight km long. Community members are protesting against the construction of a powerhouse. In a nearby village,



where a rehabilitation colony is being built, villagers are beginning to feel threatened. Construction can start anytime. Also nearly 70-80 hectares of land has been acquired at the rate of Rs 13-14/sqare foot. Around 40-50 households, about half the total number of affected households, have obtained compensation.

10. Gyatso, Age: 31 years, Dzongu, N.S., 7 family members. Dam: Panang Hydel Project, 280 megawatt, Company: Himagiri Hyderabad. Owns nine hectares and runs a family business. Testimony focused on anticipated impact of construction to land: (1) drying of water; and (2) damage to homes. Discussed the sacred nature of the Rongyoung Chu River for the Lepcha community. Stated that the Lepcha community is a community of nature worshippers and the Rongyoung Chu River is sacred. Lepcha is also known as "Rong". They hold the belief that when a member of the community dies, the Priest/Shaman recites a prayer, calling back the soul of the dead and bringing the soul to rest in the Rongyoung Chu River. Mr. Dang explained that the Rongyoung Chu River is equal in religious significance to the Ganges River for Hindus. He stated that the construction of the power house would result in diversion of water flow (through the side of a hill) and the drying up of the river. This will have detrimental impact on their religious and cultural practices.
11. Tenzing Lepcha, Age: 28 years, Lower Dzongu, N.S., 13 family members. Dam: Teesta, Stage-IV, 520 megawatt. Company: NHPC. Owns 9 hectares of land and works in the tourism business. Mr. Lepcha stated that NHPC has established an office and camps for rock testing, which has already begun. Community members raised objections at a 1997 public hearing; those members were subsequently arrested. The tunnel is planned to go through the village. Impact: (1) drying up of water; (2) damage to homes; and (3) adverse impact on cultural and religious practices. Mr. Lepcha discussed a sacred lake in the village that contains a very rare fish, namely Dengolic, found nowhere



else but here. The Lepcha clan believes that if the fish were to die, the whole clan would die. Mr. Lepcha also testified that – prior to Sikkim was annexed to India – the area – where the dam site is located – was designated as a “sacred nature preserve”.

12. Ongyal Dindong, Age: 30 years, Lower Dzongu, N.S., 12 family members. Teesta, Stage-IV, 520 megawatt. Company: NHPC. Owns 5 hectares of land. Stated that a public hearing has not been conducted and he has not signed a No Objection Certificate (NOC). Impact: (1) disappearance of the Teesta River which would have a negative bearing upon sacred marriage customs and practices within the Lepcha clan. Mr. Dindong discussed the marriage practice of sprinkling couples with water from the Teesta River during the marriage ceremony.
13. Dili Ram, Age: 60 years, Singbel, E.S., 3 family members, doesn't work. Dam: Teesta Stage-V. Company: NHPC. Impact: (1) access to water severely restricted; and (2) not able to cultivate crops. Noted that he received Rs 5,000 from the Block Development Organization in 2008 for the damage done to his home. Stated that there are about 14 homes affected in the village.
14. Chandra Lal Adhikari, Age: 60 years, Singbel, E.S., 6 family members. Dam: Teesta Stage-V. Company: NHPC. Owns 1.5 hectares of land and has worked as farmer, growing paddy and maize. Following construction, he has had no choice, but to work as labourer. Impact: (1) significant damage to home, causing collapse and shrinking of foundation; and (2) water scarcity (drying of streams) has impeded his ability to cultivate crops. He noted that he has expended a considerable amount of money to pay for the damage done to his home. He complained to the Panchayat, but no action has been taken.
15. Sanjay Sundas, Age: 25 years, Upper Tintek, E.S., 4 family members. Owns .5 hectares of land, works as a driver in Gangtok. Dam: Stage 5. Impact: (1) construction of tunnels has led to the drying up of water; and (2) has affected access to natural groundwater. The fear is that, with continued construction, aqua flow would be disturbed and this would result in a drought within 5 years. Also there is a network of tunnels that is affecting other villages like Samtung and Tintek.
16. Santosh Adhikari, Singbel, E.S., Dam: Teesta Stage-V. Company:

NHPC. Owns .27 hectares. His land was acquired by the NHPC for Rs. 1.27 lakhs. Impact: (1) labour exploitation. Now works as an employee at NHPC with designation of "zero category". Discussed that, prior to 2002, he would have been classified a "workman grade 1"; but, following land acquisition, all "land acquired persons" have been designated as falling under "zero category". The "zero category" is an "unskilled" category with severely limited facilities and benefits. The unskilled status is given despite the fact that many of the employees are skilled workers. Mr. Adhikari received help from the Teesta Land Ousted Welfare Committee which has 60 NHPC employees, who had their lands acquired by NHPC, from all over Sikkim. Following the formation of the Committee, they began demanding increased benefits. 50% of facilities and benefits demanded were provided in 2010. These include subsidies for transport, health and education. Mr. Adhikari says that he no longer has a copy of the Memorandum of Understanding regarding the terms and conditions of his employment. He hopes that he, and others similarly situated, will be classified as "regular" employees. His monthly salary is Rs 13,000 per month, which is equivalent to an unskilled labourer's position even though he works as a computer operator.



# **Analysis of the Responses to the Questionnaires sent to Government Authorities concerned and Hydel Power Companies**

Government Departments and authorities concerned and Power developers /companies were sent a questionnaire to provide them with an opportunity to respond to the issues raised by affected people in the said Independent People's Tribunal. However, most of the government authorities concerned and companies – namely Chief Secretary, Energy & Power Department, Forest Department, Labour Department, Land Revenue Department, Sikkim Power Development Corporation, (SPDC), NHPC-Teesta Stage IV & Stage-V, Gammon India, Teesta stage-III – did not bother to respond. However, the Himagiri Company and the State Pollution Control Board and District Collector East did respond to the issues raised, but their responses are not justifiable.

## **Questionnaire sent to Chief Secretary**

Government of Sikkim

30th May 2011

Tashiling Secretariat

Gangtok, Sikkim

### **To whom it may concern**

On January 23rd and 24th 2011, an Independent People's Tribunal (IPT) was held in Singtam, Sikkim. The IPT acted as an open forum for Sikkimese people affected by the hydro-power projects to raise their concerns and testify about their experiences regarding the projects.

Based on those testimonies Human Rights Law Network, the distinguished panel members of the IPT, and other experts have drafted a following questionnaire with the aim of seeking answers to issues brought up in the IPT. It is an invitation for authorities concerned to provide answers to Sikkimese people's grievances. These responses will be included in the forthcoming IPT report, being published as a book during 2011, in order to give a fair account on the matter. The book will be distributed nationally and internationally.

We're kindly asking the responsible authority/authorities to answer to the following questions before 8th June 2011 either via email (domabhutia@yahoo.co.in) or in written (Dr. Doma T. Bhutia, Legal Consultant of Human Rights Law Network, Near District Court Road, Upper Sichey, Gangtok, Sikkim). For further information, you can also call 03592-284351.

Yours truly,  
The IPT Committee

## Questions

1. Regarding the land acquisition, what was the urgency so as to do away with the public hearing as laid down u/s-5-A of Land Acquisition Act, 1894?
2. How do the hydro-power projects benefit the people of Sikkim and in particular those whose land has been acquired? What have been the concrete benefits so far?
3. What is meant with the "public purpose" in the case of land acquisitions for the hydro-power projects?
4. Have 100 percent of the jobs generated in the power projects been given to the local people (as stated in the main page of the website of the Energy and Power Department)?
5. Has the State Government put in place a development policy for the State, and if so, kindly indicate the website for public information.
6. Why are the EIA/EMP mainly prepared by agencies based outside the State without proper consulting of local authorities, i.e. of FEWM Department?
7. What solutions have/are/will be sought in regards to the grievances of affected people?

**Questionnaire sent to Shri. Shekhar Gupta**

Sr. General Manager

31st May 2011

Panan HEP

Himagiri Hydro-Energy Private Limited

Shri. Shekhar Gupta,

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Yours truly,

The IPT Committee

Specific response of the companies on the questioner's and concern of the civil society working on the protection of environment.

1. How is the Company going to enhance the overall development and welfare of the project area and its people?

The project construction activities would step up the general economic activity in the area. As a matter of policy, the Company has decided that all petty contracts would be given to the locals. As per MoU signed with Sikkim Government, one person from every affect-



ed family shall be given employment in the project. So far as welfare activities are concerned, the company has been actively taking part in welfare activities in the area as per details given above.

Civil Society Concern:-Not specified and qualified the term locals – does this mean local from Dzongu, Upper Dzongu. What will be the nature of employment? Whether the appointment will be with Hima-giri or with a sub-contractors? In the latter case, the employment then will be temporary, maximum for the period of construction.

2. How is the Company going to secure a sufficient supply of clean drinking water and water for irrigation, and prevent the drying up of water resources?

As per the agreement with Sikkim Government, at least 10% water of the river shall be released during the lean season i.e. during the winter. In addition to the above, just after 500 metres downstream of the dam location, there are many tributaries of the river, whose water shall also be available in the river. During the summer and rainy season, only 98 cumecs of water shall be used, while the average discharge of the river during these parts of the year is 120 cumecs and above. This would take care of the drinking water, irrigation and aquatic life downstream of the dam.

Civil Society Concern:-It is mandate to release water during the year including lean season, summer and rains, the authority is not the State Government of Sikkim, but the MoEF. The Expert Appraisal Committee, generally, puts this condition in the letter of clearance and the project proponent is bound to respect it. Any agreement with State Government is additional.

There is no doubt that tunnelling in Dzongu for taking the river water to the powerhouse will dry up water sources of villages and habitations above the tunnel. That the project proponent cannot stop. It is a negative impact of tunnelling.

3. How much funds are allocated for the compensations paid to the affected households in case of possible damages caused to their homes?

Utmost care shall be taken to ensure that there is no damage to the houses of local people. In case there is any damage, compensation would be paid as assessed by the District authorities.

Civil Society Concern:-For compensation to be paid is mandatory, the affected households have to be included from the very beginning within the official number of those affected directly or indirectly. The experience of Teesta V has taught the lesson.

4. What is the percentage of local people planned to be employed by the company?

The Company is committed to employ at least 70 percent of local people. Further, one person from every affected family would also be provided employment during the project construction.

Civil Society Concern:-The question is the quality and tenure of employment as indicated earlier. Local people may need to include from Mangnan or elsewhere within a radius of 25 to 30 kms.

5. What previous experience does the Company have in conducting hydro-power projects of this scale? In which parts of the country it has been operating?

The Company has executed six hydro-power projects in the state of Karnataka earlier. For this project, the Company is going to hire several prominent hydro-experts as consultants and designers.

Civil Society Concern:-But the said company did not provide a list of such projects in Karnataka with the generation capacity and the exact name of the companies respectively. Himagiri is an amalgamation of companies, or could be a sister company of some other companies and linked by the Board/sister Company also to Teesta Urja, Athena etc. The genealogy has to be clear to get an idea.

6. Which financial institution(s) is/are financing the project? In the case of unforeseen major expenses, what plans does the Company have to bear for the costs?

The Project is being jointly financed by two Government of India institutions namely M/S Power Trading Corporation Financial Services

Ltd. and M/S Rural Electrification Corporation Ltd. For unforeseen major expenses, the Company would bank upon additional funding or depend upon the reserves of its mother/promoter company i.e. M/S Nagarjuna Fertilizers and Chemicals Ltd. (NFCL). NFCL is a large and financially sound listed company on most of Indian Stock Exchanges.

**Civil Society Concern:** It is also a large construction company engaged in infrastructure projects. The parent or mother company has some hedge fund investment also – Blackstone of US.

**Response of M/S Himagiri Hydro-Energy (P) Ltd. (Panan Project, Upper Dzongu)**

## Approvals

At the outset, before the specific questions are replied to, it would be pertinent to mention that while planning and investigating the Panan Project, utmost care has been taken to ensure that neither the religious and cultural sentiments of local population are hurt, nor the ecology of the area is jeopardized. All the concerns of local people were carefully heard, appropriately responded to and documented during the public hearing of the project which took place in September 2006 in which more than 200 local people took part and expressed their concerns. Most of the commitments made during the public hearing have been fulfilled by the Company and the remaining commitments shall be complied with during the construction stage.

The approval to carry out site investigations was received from the Ministry of Environment and Forests, Government of India vide their letter dated 06.10.2005, but before the site investigations were started, a comprehensive Environment Impact Assessment (EIA) was carried out through CISMHE, New Delhi in 2006-07 and based on the said EIA, an Environment Management Plan (EMP) was prepared for Panan Project by the same agency, which was duly considered and approved by the Ministry of Environment and Forests, Government of India, before according the Environment Clearance for this project in 2007 and some of the concerns expressed in the EIA and EPM were incorporated as Conditions in the Environment Clearance by the Government of India. All such condi-

tions are being complied with considering the cultural, religious and ecological concerns of the local people, once again the State Government in 2007, appointed a High Level Committee including some prominent environmentalists and officials of the Ministry of Environment and Forests, Government of India. The said Committee gave its recommendations to the Government of Sikkim in May 2008 and after duly considering the said recommendations, the Government of Sikkim agreed with the said recommendations and decided that the Panan Project should come up, while all other projects upstream of Panan Project on Tholung Chu River should be cancelled.

### **Welfare activities carried out in the project area**

Before replying to the specific questions, it would also be pertinent to mention a few words about the welfare activities being carried out by Panan Project authorities in the Project Areas (Upper Dzongu). During the past four to five years, we have carried out the following welfare activities:

1. We have been providing scholarships to the tune of Rs. 1500 per student per month to 52 meritorious students of the project area. Selection of beneficiaries is being made through a local NGO called Mutanchi Lom Aol Shuzom (MLAs).
2. Prizes are being given by this Company every year to three toppers of 10th and 12th standard from the Project area (Dzongu) on the Independence Day every year.
3. Laven village in the project area has been adopted as the Model village. A mid-day meal hall with a kitchen and storeroom has been constructed there for the elementary school children. The construction was got done through a committee chaired by the Headmaster of the school having a few members from Laven Village, including the Panchayat Member. Several other works are also planned which shall be done during the construction stage.
4. We constructed a concrete footpath of about km length for the people of Sakyong village near the proposed Dam site by spending about Rs. 9 lakhs.
5. Constructed two cremation sheds in Lingthem and Laven villages.
6. Himagiri Hydro has been participating actively in various cultural,

social and religious functions of the local people in project area. Important events in which we participate every year include, Namsoong Festival (Lepcha new year celebrations), Children Day Celebrations in at least one school in the project area every year, Music Festival in Mangan, Rum Faat (Puja) at Tendong and Lingzya monasteries, sports tournaments in the area etc. We have also been participating in the social events like, marriages and condolences among the project affected families. Current year's budget for such activities is Rs. 20 lakh, as against the expenditure of about Rs. 12 lakh during the previous financial year.

7. In addition to the above, we have hired vehicles of the local people, provided employment to 10 persons from the project-affected families, carried out most of the works at site through local people.
8. We carried out skill-development camps in three project-affected villages for developing skills like bamboo works, carpentry and masonry.
9. Held four health camps in the project area for the villagers/students with the assistance of the district health authorities.

### **Actions need to be taken during the construction stage:**

- a) Employment to be provided to at least one person from every project-affected family.
- b) 100 houses are to be constructed in the project affected area by spending about Rs. 5 crore.
- c) PWD road to upper Dzongu (including construction of two new bridges of 40 tonne capacity). which is the main arterial road in upper Dzongu, is being upgraded and improved by M/S Himagiri Hydro Energy (P) Ltd by bearing the cost of Rs. 16.50 crores, out of which Rs. 4.695 crore have already been released to the Road and Bridges Department of Sikkim Government.
- d) Namprikdang ground in Dzongu area is the centre for all cultural activities of Lepchas. We have provided for a sum of Rs. 3.3 crore for protection of this ground and peripheral areas.
- e) A sum of Rs. 909.81 lakh shall be spent on Catchment Area Development over five years, out of which a sum of Rs. 332.78 lakh has already

been released to the Forest Department.

- f) A sum of Rs. 119.45 lakh shall be spent on compensatory afforestation and the amount has already been released to the State Forest Department.
- g) A sum of Rs. 127.48 lakh has been provided to the Forest Department for Biodiversity preservation and planning.

### **Additional information**

- 1. All the project components are way outside the Wildlife Sanctuary or the Reserved Forests. The Wildlife Department has given its NOC way back in 2006 for Panan Project.
- 2. Large majority of people living in Dzongu area are in favour of this project.

### **Concern of the civil society**

This is perhaps not true at all. The EIA 2006 has put limitations to projects within the 10 kms of National Park and Wildlife Sanctuary. Now, by the Forest Rights Act, 2006 no forest land of any nature can be diverted or acquired for a project without the consent of the gram sabha or village councils. The KNP is well within 10 kms of the project site and actually at the top of it, may be spaced out by 4 to 5 kms. There is bound to be huge impact and KNP is famous for endangered wildlife, flora and fauna including – Red Panda, Snow Leopard etc. The NOC, I would say, still is wrong.

As for people living in Dzongu, one can always ask for a free and fair referendum.

Further Shri Dawa Lepcha, Environment Activist responses as for the reply to the questions it is all tricky. They may have fulfilled some petty commitments, but on the whole it is with the end target to get their way in as you may have made out.

Their so-called 'comprehensive EIA' does not contain the ethnographic/anthropological section, which is one important aspect of EIA. There is no mention of even the word Lepcha, leave out their culture and tradition etc. The High-Level Committee they mentioned also did not go into

this aspect in their report.

On the one hand, they mention endangered species of animals in the catchment area, on the other hand, they are going to execute CAT work in duration of four years in the Khangchendzonga National Park, this will involve hundreds of labourers and workers running free in the National Park. The CAT is primarily being executed to protect the reservoir from siltation, as made out clearly in the specific conditions of the Environment Clearance, and not to protect and preserve the Park as is being made out by the company.

The answers to the specific questions are true, but as mentioned before they are petty and some pathetic like – the footpath to Sakyong village in question 4. 'About a kilometer footpath' is a joke, as Sakyong is way far away. (It is frustrating, but people are ok with all these.)

Action during construction does not specify whether the employment provided will be permanent or only for the construction period. What do they mean by project affected? Does it mean only the landowners whose land has been taken away or the others, too, who will be affected by the construction activities? Any way, all these are for their own easy passage.

## State Pollution Control Board

The responses of the State Pollution Control Board (SPCB) was submitted by Mr. Manjit Singh, IFS, Member Secretary.

1. It is testified by the affected people that the public hearing was not conducted at the site or the close proximity of it in several projects under construction. What is the factual position?

All the public hearings conducted by the Board till dates have been situated in the central location with approach road connectivity there by making it convenient for all the public of the project area to attend the same. Further, the Project Proponents have been directed by the Board to provide transportation (to & fro), for the project-affected people to attend the hearings.

Civil Society Concern:-Providing transportation cannot be a reason to choose the venue of PH out of the project site. Is the SPCB saying that if a PH is conducted near a project site, that venue may not be well connected. Then, how could the locals live there and it will be

only the locals who will attend the PH. Therefore, there cannot be any lame excuse of not conducting the PH in the locality. Of course, the other officials may have problems with roads that they are to blame for, or with star hospitality. Teesta V PH was conducted in Gangtok, far away from Dikchu.

2. Are the EIAs, EMPs and DPRs available on the official website of the SPCB in the local languages?

No, all of them are printed in English language. However, executive summary of EIAs & EMPs are printed in Local languages.

That does not satisfy the question whether they are on website or not. Printing the summary in local language is mandatory, but with the Sikkim Government being pro-people, pro-green (as they say) should have gone extra miles to print the full EIAs and EMPs in local language. What does that local language mean? Nepali, I guess and not Lepcha/Bhutia. There has not been any effort.

3. What are the mechanisms put in place to monitor the muck, disposal?

The project proponents have to obtain permission from the SPCB prior to disposal of the muck in the designated place, further the SPCB & the Multi-Disciplinary Committee constituted by the MoEF, Govt. of India, monitors the project during its construction phase.

Civil Society Concern:-The Teesta V episode exposed the chinks in the name of monitoring which the SPCB is not at all interested in. These are all in the books or in some MoEF guidelines, but in actuality, is not monitored periodically. Otherwise what happened in Teesta V should not have occurred. Currently, I don't think that external monitoring is at all necessary. The MoEF amended that to self-monitoring and voluntary compliance by the project proponent. But, the State Government should have a foolproof mechanism to monitor the compliances including – muck-disposal.

4. What has been done to improve the locations for dumping the excavated material?



The project proponents are required to follow the conditions laid down in the Environmental Clearance issued by the Ministry of Environment & Forest, Government of India.

Civil Society Concern:-The fate of compliance stays as above. It is really unfortunate that the SPCB or State Government puts everything in to MoEF's court. They do not want to be responsible and accountable to its own people.

# JURY FINDINGS & RECOMMENDATIONS

## Independent People's Tribunal on Dams, Environment & Displacement

A public hearing for two days on the effects of the power projects on Teesta River in Sikkim was held on 22nd and 23rd January, 2011 at Singtam, East Sikkim. The hearing was attended by a number of affected groups, individuals and organisations from Sikkim, who came from far off places and who gave testimonies regarding the effect of dams on the villages as well as the surrounding areas and environment. A number of experts also deposed before the Tribunal and submitted documents pertaining to the after-effects of the dam. The views expressed by the affected villagers and experts in the field were heard by a Panel of three members comprising of Justice K.K. Usha, [Retd], who is former, first Lady Chief Justice of Kerala High Court, Smt. Gayatri Singh who is one of the leading senior labour lawyers in India, and activists Ravindranath and Shri Arnab Bhattacharya. Based on the views of experts in the field and the deposition of the villagers from different villages in East, West and North Sikkim, the following findings and recommendations emerged:

- 1) Sikkim is blessed with the world's third highest mountain peak Mt. Khangchendzonga, the Zema glacier and various other small glaciers, and small streams which are sources of water to Teesta. There are a large number of water bodies distributed throughout the state in form of fresh water lakes and streams. Environmental clearances for the various projects on the Teesta River have been given based on inadequate EIA Reports. This is evident from the fact that after perusing the documents, it was seen that the EIA Reports are based on outdated data, methodology, fail to look into various alternatives, the impact of the large number of projects on eco-systems including socio-economic aspects, costs etc. To assess correctly the existing ecology in the environs was absolutely essential, since the entire Teesta River is to be tunnelled through explosives and blasting. Sikkim, which is a tiny Himalayan state, is rich in natural resources, flora and fauna and the Teesta River forms an integral part of this ecology and bio-diversity. In an area of about 7096 square kilometres more than 20 hydel

power projects are sought to be constructed and the after-effects of such construction and damming of the river has not been taken into consideration in the EIA Reports.

- 2) It was found that most of the EIA Reports have been prepared by the companies who have been awarded contracts for constructing the hydel power projects and it was, therefore, in their interest to completely gloss over the existing bio-diversity in the area. The EIA and the Environment Management Plan (EMP) have been prepared not only by private companies, but most of these agencies are based outside the state, and have no knowledge about the ecology and bio-diversity of the area. The preliminary data-sheets collected during a survey were never audited and hence the authenticity of the data collected could not be verified. Most of the contracts have been given to private companies with the government receiving only 12% free power from these projects. The government will be a minority stakeholder in these companies, and will be putting in 26% equity shares which is to be arranged on loan by the companies and this is to be paid back at the approximate interest rate of 15% per annum from the 12% free power or revenue that the Government will get from the projects. If this repayment is to be followed, a meagre amount of net revenue inflow will be available to the government. Being a minority stakeholder, the government will have no control over the functioning of the companies.
- 3) From the documents prepared by the government, which was furnished to the Tribunal, it is evident that the investigation carried out by the project developers did not involve officers of the department concerned. Therefore, the veracity of the data furnished to the Government of India could not be tested. The fact that the EIA/EMP were not based on correct data and information has been recorded in the C.A.G. Report of 2009.

### **Generation of power beyond state requirement**

- 4) That even otherwise Sikkim requires approximately 80 MW of electricity and that it has sufficient electricity and does not need additional hydro-projects for generating electricity. The present hydro projects will generate about 8000 MW. It is, therefore, evident from

the records furnished to the Tribunal that the power to be generated from these hydro-projects would be exported out of the state.

- 5) That though the Teesta basin can support only about 2000 MW of hydro-power capacity, the Sikkim Government has signed MoUs with private companies with total capacity of 5600 MW. The report prepared on behalf of the Union of India, Environment and Forest Ministry, has categorically stated: "Thick moraine deposits at several sites in North Sikkim provide weak sub-strata on which it seems very unsafe to establish any mega developmental project. Establishment of even smaller projects in this region would require detailed surveys and sub-surveys, investigations as well as proper engineering and seismic designing." This has admittedly not been done.

### **Scant regard to expert reports**

- 6) A report by the Department of Mines, Minerals and Geology dated 2003-2004 has also warned against the ill-effects of rampant mining, blasting, tunnelling and dumping of mountains of muck on the land, water sources, slopes etc. It has also been recorded that instead of carrying out a detailed geological study of the area including the fragile geo-environmental conditions of the overlying slope, the project authorities have laid more emphasis on engineering details, cost and progress of the project. No detailed seismic report has been carried out in the area and the recent earthquake which completely destroyed the northern part of Sikkim only confirms the fact that the hydro-power projects are located on seismic area.
- 7) The entire state of Sikkim is seismic prone and falls in Zone V.
- 8) The frequency of landslides in the last few years may be partially attributable to the negative impact of the developmental activities in a highly sensitive ecological area.
- 9) A large part of the North District is to be dammed and this is the area which was badly affected in the earthquake, and despite the extensive damage in the area, the government is mindlessly going ahead with the projects being blind to the plight of the people. North Sikkim is the largest district constituting about 60% of the entire state.
- 10) The recent earthquake has confirmed the apprehensions of the villagers regarding the viability of various projects. Objections had been

raised by the local people and geologists regarding the dangers of tunnelling the river in view of the seismicity in the area. These objections have been completely overlooked by the government who appears to be determined in its plan to construct various projects on the river which appears to be helping and profiting the private companies, rather than the state and its people.

### **Violation of the right to live with dignity**

11) A large number of villagers testified to the following destruction of their villages, houses and livelihood:

- (i) The constant vibration caused due to drilling of the mountains to make tunnel and blasting near the villages have led to the death of livestock and affected poultry farming, cultivation.
- (ii) That the land near the tunnels have been adversely affected and their houses damaged. The farmers living in Singbel village have virtually become homeless, since their houses have developed huge cracks making it unsafe to live in so that during monsoon the villagers have to take shelter in other villages.
- (iii) The perennial water sources of Ralap and Singbel villages in East Sikkim have dried up completely and their agricultural land has become uncultivable reducing the villagers to penury. The Head Rest Tunnel (HRT) runs across this village. Due to this tunnel and continuous blasting most of the houses in the villages have developed cracks.
- (iv) From the correspondence, it was seen that though the government had assured the villagers that their houses would be repaired and that they would be paid compensation, no such efforts were made by the government.
- (v) Since their farmlands have been completely destroyed, the villagers are forced to work as daily wage labourers and even that income is not regular.
- (vi) The residents of Jang village on the left side of the submergence zone find that their land is slowly subsiding due to the

rim treatment and other works carried out with regard to Teesta Stage V Project.

- (vii) The villagers of Chungthang, Pegong and Theng submitted a petition regarding the damages to their property due to construction work in Teesta Stage-III by M/s. Teesta Urja Ltd. The extent of the damages was admitted by the geologists from the Department of Mines, Minerals and Geology, Government of Sikkim and the only suggestion given is that there should be "low intensity blasting."
- (viii) The Tribunal was informed that though about 45 houses including concrete buildings have become uninhabitable and though there was fresh water available, there are no fresh fish in the reservoir.
- (ix) That various government reports including the study done by the Centre for Inter-disciplinary Studies of Mountains and Hill Environments have confirmed that the blasting of mountains led to drying of perennial water sources. In one of the projects, a natural spring has dried up after the tunnelling, and though the drying of perennial water source originating below the Sivalaya Mandir was brought to the notice of the officials, no steps were taken to prevent the ecological damage being caused due to the blasting of mountains.
- (x) That the public hearing has not been done properly as per the law.
- (xi) That the people are put under lots of pressure and coercion to receive compensation and their agricultural lands are taken in throw-away prices like rupees four or eighteen per square feet.

### **Adverse impact on environment**

- 12) A number of studies done by experts including government agencies have confirmed the fact that hydro-electric projects will cost permanent damage to the local flora and fauna, and that fragmentation and loss of habitat threatens the survival of birds habitating in the area, and it has been recorded that the after-effects of the hydro-power

projects will cause extinction of the rare species found in the Himalayan state.

- 13) A large part of the area where the hydro-power projects are to be constructed fall within the territory of the Kangchendzonga National Park (KNP). The importance of KNP has been recognised by the Government of India which has nominated it on its tentative list of UNESCO World Heritage Sites.
- 14) The environmental clearances have been given contrary to the orders of the Supreme Court in the Godavarman case, as well as the provisions of the National Wildlife Board and the Wildlife (Protection) Act, 1972 and other laws like the Environment Protection Act.
- 15) Contrary to the provisions of various laws, Panan Dam site is located within the buffer zone of the KNP and is hardly 2 kms. from the core area of the Park.
- 16) Various studies indicate the presence of more than 50 species of fish in the waters of Teesta River. The Wildlife (Protection) Act, 1972 and Bio-diversity Act, 2000 is being implemented more by its breach.
- 17) That prior to the acquisition of the land of the farmers, a hearing should have been given to them. However, in all cases, the villagers who deposed before the Tribunal have stated that no public hearing was given on the ostensible plea that the acquisition was urgent.
- 18) That not only was their only source of livelihood which was their agricultural land being taken away, but they were also being dehouseed due to the serious damage caused to their houses.

### **Cultural genocide**

- 19) The influx of large number of migrant workers from outside the state has disturbed the lives of the indigenous tribal people who are a minority in the state. Thus, leading to demographic social and cultural upheavals.
- 20) All those people whose lands have been forcibly acquired have been designated as "zero" category which signified unskilled labourers, despite the fact that many of them are skilled workers. On the basis of this designation, they have been paid paltry sums of salaries.
- 21) Serious violations of human rights have been recorded when the vil-

lagers protested against the intrusion into their lives and livelihoods by the power projects. Many villagers have been picked up and put behind bars on false and trumped up charges.

## RECOMMENDATIONS

- A. In the light of the above, the Government of Sikkim and the Ministry of Environment and Forest ought to stop construction of various hydro projects on the Teesta River, till an independent and impartial EIA is prepared by a competent agency not connected with the private companies, and a detailed study into the environment, ecology, wildlife, seismicity, socio-economic aspects of the villagers who are to be affected, cost-benefit analysis of the project etc., ought to be carried out.
- B. The villagers whose houses have been damaged ought to be compensated and their houses repaired.
- C. The farmers whose lands have been taken away and/or whose lands have been damaged should be restored back their lands in their original condition and paid compensation for the loss of earnings caused to the villagers.
- D. Rampant violation of human rights by use of force including arrests, restriction of movement, and other indignities to suppress legitimate peaceful protests by the locals needs to be investigated by a proper and impartial authority.





# REPORT ON DAMAGES CAUSED DUE TO BLASTING AND OTHER ACTIVITIES BY TEESTA STAGE III



DEPARTMENT OF MINES, MINERALS & GEOLOGY  
GOVERNMENT OF SIKKIM  
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April 2010

**Report to Damages caused due to blasting and other activities by Teesta Stage III HEPF under construction by M/s Teesta Lila Ltd. in North Sikkim.**

The public of Tsangthang, Pelling & Thong submitted a joint petition, complaining of damage to their property due to construction work of M/s Teesta Lila Ltd. As per the request made with letter No. SPDC/34/140 dated 4.02.2010 by SPDC, a joint inspection of the area was conducted on 11<sup>th</sup> & 12<sup>th</sup> Feb 2010, by a team of geologists from the Department of Mining, Metallurgy & Geology, Chief of Project Engineers of SPDC, Bhandaraya and local people.

Teesta Hydroelectric Power Project Stage III with total capacity 1100MW of power is under construction in full swing in the vicinity of Tsangthang, North Sikkim.

1. **Chungthang:** (26°36'14" & 84°10'45"E) Chungthang Bardoloi Township is situated between Lachen river in the west and Lachung river in the east. The lowest elevation i.e. river bed level is approx. 3335 msl and elevation at the junction of Lachen & Lachung road is 3350 msl i.e. 1750 feet. As per the geological section provided by the project authority the section A-B & B-C, consisting of the segment cover sections of unconformated slope west oriented followed by semi consolidated river bed material. The average thickness of slope waste material and river bed material is more than 10 mts thick. The bed rock consisted of Quartzite with thin partings of marble-bearing schist exposed along the Lachen river. They show 5 mts of discontinuity exceeding 20 mts whereas along Lachung river the bed rock lies beyond present river bed.

Geologically Chungthang is an a river course with deposits consisting of boulders, gravels, pebbles embedded in semi consolidated to consolidated sandy silt matrix.

The main rock type exposed in the area are quartzite with thin intercalation of quartzite. Schist was steep dip inside the hill slope i.e. (Dipster west strike to or W – SSE dipping NNE with dip maximum exceeding 50°). The slope above the Chungthang valley is steep with little soil cover and area is difficult to access. Number of debris boulders and wedge formation are prominent in the slope at that area is known for channelling weathering.

The main components of Project Project viz. dam spillways, intake, de-siltation channels and breach of existing saddle lies within 200-500 mts. from the area under provisioned.

In the past, the area was free from major instabilities except bank erosion and impact of development of cracks on R.C.C. buildings was noticed. The present developments/complaints viz the activities of ongoing projects i.e. impact of blasting and other activities in the vicinity. The severity of damages can be seen from the developments of cracks on beams and floors of R.C.C. buildings (Photo graph enclosed) having cracks the cracks developed on partition.

Similar to Tsangthang township such as Bhandara, Singtam, Rangpo situated over similar geological conditions i.e. over terrace deposits, experienced no damage to R.C.C. structures. The main cause of damages in Tsangthang is, therefore, the outcome of ongoing activities i.e. blasting in close vicinity.

As discussed above, major hazards in the form of channelling boulders, landslides initiated in rock slope will remain constantly under present condition of indifference blasting, rapidized slope modification, movement of heavy earth masses, residential structures etc.



The major cause of concern at post commissioning of project is going to be the negative impact of draw down effect on downstream reservoir area of Teesta Stage V. As per data provided by the project authority, the reservoir area extends 1km upstream of both Lachen & Lachung river, i.e. upto 1185 masl. The slope forming material within reservoir area are either close to or minimal so slope with material and sudden fluctuation of water level will lead to slumps in the post pressure affecting the steep concept of, unconsolidated/unstabilised mass. As per the data provided by the project authority the maximum drawdown level will be 1185 masl and with full reservoir level at 1585 and minimum draw down level at 1565 masl. The existing Chungthang bridge is at 1590 masl and the water level will be 1 m below the existing river. There will be fluctuations of 20 m of water level during lean period. However, during other period of the year water level will be kept at minimum draw down level. Taklungthang area has experienced several episodes of glacial lake outburst floods in the past. It is not known how the project project development in the Thum river basin going to handle such awesome natural events along with earthquakes of high magnitude which Bhutan is prone to.

In the event of flooding in the upstream area, the flash flow has to be speeded and the impact of draw down will depend on the speed of release of water from the reservoir (after water discharge started in Teesta Stage VI). In order to overcome the negative impact of draw down, reservoir run strategies throughout the reservoir area has to be taken up prior to commissioning. The main purpose of draw treatment should be to protect the slopes all around the reservoir from frequent slumping and seepage of reservoir water. As discussed, to minimise the impact of draw blasting to be practice.

Further to avoid damages/accidents by shooting boulders, rockfall and rock topple, identification of such areas/strata has to carry out and appropriate corrective measures has to be taken up.

## **II Pegang and surrounding area (N27°36'01" Latitude-88°18'58" Longitude)**

HRT and blasting tunnel are located at V depth targeting from 1720 - 1920m and 1800 - 1800m blasting level is at 1565 - HAT 1540 - 1530, + 110 m to + 120 m and + 20 m to + 250 m. The cover consists of thick blanket of slope wash material and rock cover. The main rock type within Pegang are quartzite/Biotite quartz schist and rock mass rating is designated as Class IV to V and categorises as poor to very poor rocks. They are folded and fracturing and blasting are common. The rocks are generally striking NW-SE dipping moderately towards SE. The overall slope condition of area is moderately steep and numerous small scale disconformities and settlement has come up in both side of the road. Prior to ongoing activities, failure such as development of cracks on R.C.C. structures has not been reported in the past.

Keeping in view of overall geological and geo-morphological condition of area, absence of any structure failure in the past the main attention focus is ongoing activities especially due to underground blasting and tunnelling and their consequences.

Main underground activities lies below Pegang identified settlements cluster HRT and other settlements and further damages in future can't be ruled out.

There is enormous the impact low intensity blasting and immediate elimination of impact system to solve the solution

- iii. **Impact Area:** The area under consideration falls with N27°5'60 Latitude E 88°18' 48° Longitude at an elevation of 1300 to 1750 meter level. During impact assessment, concrete structures as well as earthen structures in the area have suffered impact of ongoing activities. The main activities are blasting for tunnelling both in Head Race tunnel and Adit II. The main rock types in the area are Calc-silicates, schists and gneiss of Changuang formation. The rock classification is designated by project authorities belonging to RMC II to III i.e. good to fair where as quantity (BMR) values belong to class II to III the lithological content are either massive or fractured and belongs to class IV & V i.e. poor to V poor rocks. As per the information provided by local people that a parallel fracture on surface has occurred at the time of road construction in the area in the past and have further expanded in the recent times. The HRT passes at about 100-150m. below the surface and the area is free from any erosion by the river Teesta in the past and there is no report of geologically unstable terrain in the area. As such the main cause of distress is blasting activities.

The HRT is likely to pass through stopper village located approx. 3km from Teesta which is likely to be affected as and when the HRT passes through the area. Under such conditions the project authorities EPDC or district authorities are advised to collect information on conditions of public properties and other geological parameters in the area. So as to compare the impact of blasting and blasting.

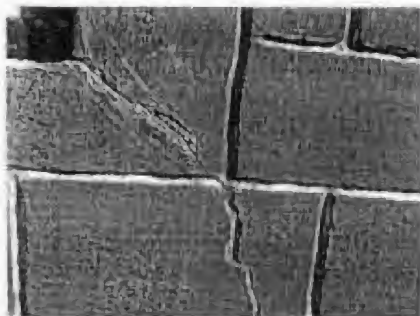
Low intensity blasting is suggested in the area where human settlement lies above the area of activity.



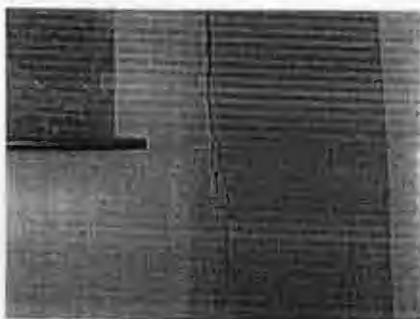
Cracks on semi-skru house at Chungthang



Cracks on the houses at Chungthang, North Sikkim



Cracks develop on the wall of half RCC and half Katsu house at Theng busey, Chungthang.

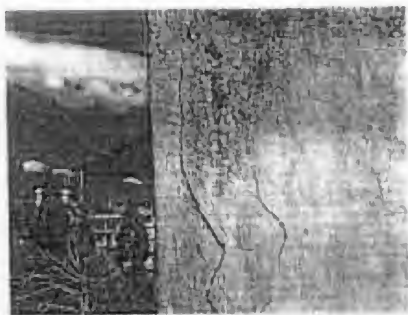


Cracks develops on the RCC building at Theng Busey, Chungthang



Cracks develop on the newly constructed RCC buildings and people try to hide the cracks on the houses at Chungthang bazaar, North Sikkim.





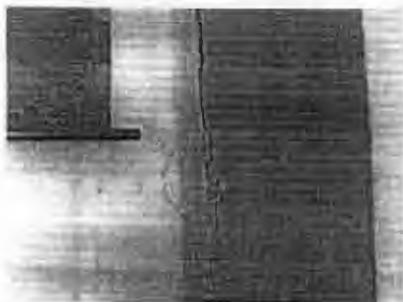
Development of cracks on the Column of RCC at Pongson bumpy,  
Chungsheng.



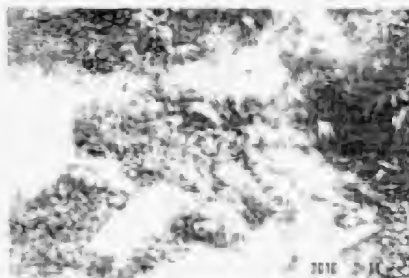
*Curio and Displacement on the residential house at Chungfeng, North Sichuan.*



Cracks on beams of RCC building photograph taken during damage assessment at Chungthang



Cracks on partitions of RCC building at Chungthang



Drying of Spring water at Theng Busty, Chungthang, North Sikkim.



# REPORT ON DAMAGES CAUSED DUE TO TUNNEL EXCAVATION AND OTHER ACTIVITIES UNDER TEESTA-HYDRO-ELECTRIC PROJECT STAGE V

## Report on damaged caused due to tunnel excavation and other activities under Teesta Hydro-Electric project stage V

Sikkim being a mountainous terrain with rugged topography, fragile geological set up, then technical investigation is pre-requisite for taking up developmental project in general and hydro-electrical power project being complex needs special consideration. Any developmental activities with intent regard to geology, eco-system, slopes, hydrology of any given area can prove counter productive & investment unfruitful. Change of prevailing condition of developmental activities needs thorough knowledge of geology, hydrology, slope configuration, behavior of natural waterways, environment, identification of proper management of lands generated etc. The department of Mines, Minerals & Geology has obtained enough experience and understanding of mountain condition and their importance. Because of the said experience, the department was given opportunity to study the project area while addressing complaint of people regarding damages caused due to tunnelling and other activities of NHPC in the area and reports were submitted covering the following areas

1. Singbell area.
2. Koholey area.
3. Lower Sandung area.

The present report covers updating of earlier investigations and additional parameters done, also the study areas





The construction of the dam and reservoir has led to the displacement of thousands of people and the destruction of their homes and livelihoods. The government has failed to provide adequate compensation and resettlement for the affected communities. The dam project has also caused significant environmental damage, including deforestation, loss of biodiversity, and pollution of the surrounding water and soil. The government has failed to take any measures to mitigate these impacts or to ensure the long-term sustainability of the project. The affected communities have been left with no choice but to accept the government's offer of resettlement, despite the fact that they have lost their homes and livelihoods. The government has failed to provide any support to help them rebuild their lives. The dam project has also led to the loss of cultural heritage and traditional knowledge. The government has failed to take any measures to preserve these important aspects of the community's identity. The dam project has also led to the loss of access to natural resources, including forests, rivers, and mountains. The government has failed to take any measures to ensure that the affected communities have access to these resources. The dam project has also led to the loss of access to health care and education. The government has failed to take any measures to ensure that the affected communities have access to these essential services. The dam project has also led to the loss of access to justice. The government has failed to take any measures to ensure that the affected communities have access to a fair and impartial legal system. The dam project has also led to the loss of access to information. The government has failed to take any measures to ensure that the affected communities have access to accurate and timely information about the project and its impacts. The dam project has also led to the loss of access to participation. The government has failed to take any measures to ensure that the affected communities have a say in the decisions that affect their lives. The dam project has also led to the loss of access to representation. The government has failed to take any measures to ensure that the affected communities have a voice in the decisions that affect their lives. The dam project has also led to the loss of access to redress. The government has failed to take any measures to ensure that the affected communities have a way to seek and obtain compensation for the losses they have suffered. The dam project has also led to the loss of access to justice. The government has failed to take any measures to ensure that the affected communities have access to a fair and impartial legal system. The dam project has also led to the loss of access to information. The government has failed to take any measures to ensure that the affected communities have access to accurate and timely information about the project and its impacts. The dam project has also led to the loss of access to participation. The government has failed to take any measures to ensure that the affected communities have a say in the decisions that affect their lives. The dam project has also led to the loss of access to representation. The government has failed to take any measures to ensure that the affected communities have a voice in the decisions that affect their lives. The dam project has also led to the loss of access to redress. The government has failed to take any measures to ensure that the affected communities have a way to seek and obtain compensation for the losses they have suffered.





whose separation in the form of cracks/sinks throughout the surface are giving easy passages of water through the openings. Further formation of ponds/flumes all along the slope is suspected, which is infiltrated deep areas of water within slope wash materials and thereby diminishing the overall stability condition of the area already at threat of erosion.

Keeping in view of the alarming slope deformations, further probes and monitoring activities and their impact on existing slopes is according the following observations and suggestions are rendered:

1. It appears that more emphasis is on engineering or anti-erosion engineering structures, over and progress of project to project pursued rather than ecological approach to ecological health of the area as a whole and understanding of behavior of fragile geo-environmental condition of the sensitive slope at the time of monsoon /seasonable or non-flood season (1999 and 2000) etc.

2. When a slope is observed after the monsoon, suggesting any erosion or landslides, the following steps should be taken:

- a. The slope should be monitored closely for any further erosion or landslides.
- b. The slope should be stabilized by the following steps:

i. The slope should be stabilized by the following steps:

- a. The slope should be stabilized by the following steps:



**Damage due to blasting/tunneling and other activities of NHPC under Teesta hydro-electric Project Stage-V.**

Approximately 18km long HRT with 9.5m finish dia is at the verge of completion in the area between Dipu Dara and Dikehu in parts of East Sikkim. Five construction audits were driven for speedy construction of HRT. The intake level is at RL 553mts with three intake tunnels and over all fall up to surge shaft is 27mts. HRT runs through low-grade metamorphic terrain consisting of quartzites, Phyllitic quartzite, Phyllite & quartzitic phyllite with occasional quartz veins. Systematic geological mapping and traverse geological mapping on: 25,000 scales were carried out by GSI and NHPC along tunnel alignment on the surface to evaluate rock quality and structural component of rock. On the basis of studies carried out, number of shear zones were inferred at various length of HRT. By and large favorable (fair to good) tunneling conditions were anticipated except along shear zones. Safe rock coverage was inferred on the basis of traverse geological mapping and drill hole in Rangchung Khola which revealed 22.86m thick overburden in the nala bed.

Since the excavation of tunnel under progress is being carried out by controlled blast, the amount of explosives detonated is based on the rock quality with emphasis on progress of work. The progress of tunnel excavation is ahead of stipulated time. The responsibility of contractor or the owner's engineers is to determine the maximum weight of explosive without damaging the structures on the surface. The predetermining of quantity of explosive to be used without damage depends on prediction of intensity of ground vibration as a function of charge weight, distance from detonation, properties of transmitting medium and level of ground vibration which can be tolerated by the different types of structures.

*File 11.11.11.11*

*7*

In case of project area under consideration, though the distance between the structures and actual area of blast is known the actual thickness of sound rock cover and superficial material is difficult to determine throughout the tunnel alignment. As reflected in the report, the drill hole driven in nala bed of Rauchang Khola indicates thick overburden. In hilly terrain the superficial material in major waterways are much less than the surrounding area. The rock cover can be inferred on the basis of exposures on the surface in close vicinity, and the angle of exposed rock face or discontinuities/ escarpment and also from rock exposure in nala section.

The damage caused due to blasting under prevailing geo-environment condition is not proportional to vibration felt at the surface as vibration is damped/consumed by semi consolidated materials. Depending upon the rock cover, the materials in contact zone (contact between overlying slope forming materials & the rock face over which it is rested) will be affected at first in the form of disturbance of inter-singular bonds, diminishing cohesion and gradually migrates towards the surface. Also the space/ fissures or voids so formed is likely to provide easy access of water giving rise to internal erosion and further reduction in cohesion of slope forming material and reduction of frictional resistance depending upon the plane over which it is rested. This action is likely act as chain reaction till natural equilibrium is fully met. If the materials are clays and fine-grained sand under saturation condition, rotation or slight displacement within contact zone is sufficient to promote super-saturation leading to formation of cracks and fissures on the surface irrespective of thickness of slope forming materials at later stage than the actual event.

Keeping in view of the facts, an attempt has been made to identify the cause of damages sustain on structures and depletion of perennial/seasonal water sources of the following areas.

*File no. 1000/2010*  
*10/10/2010*

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**Singbell Area:** Area under investigation of Sing bell consists of thick cover of slope formed by failed material consisting of boulders/rock fragments of various dimension in sand/silt and matrix. Highly jointed rocks are exposed on western part in the form of escarpment. The rock face/fracture plane/rack discontinuity is semi vertical and some condition appears to be persistence at depth when HRT is at approx. 1.1km depth and Adit runs to it through the overburden material and rocks to join HRT. Tunnel alignment survey was conducted to transfer the tunnel alignment on the surface during April 2003. At the time of Survey, work was under progress in Adit only and most of the houses under consideration including a School building were at considerable distance from the actual work site. In the earlier report the newly constructed house of late Balbir Warhool having no sign of distress if any firm was kept for reference to ascertain the impact of blast/tunneling in the area.



During recent visit, the same house was found damaged. This clearly indicated the adverse impact of blasting & tunneling activities and complaint of damages in the area is justified. Investigation was carried out during April 2007 in C-1-Misc case 3/1002 in the court of district Magistrate, Gwal.

**Kohlay/ Patuk Area:** The area falls within low-grade metamorphic terrain consisting of Chlorite, Sericite, Pyllite, Quartzite, Phyllite quartzite. The rocks are exposed on the eastern and northern part of the area as escarpment. The rock face/fracture plane/rack discontinuity is semi vertical to western part of the area and houses under consideration are situated over thick slope forming material consisting of boulders/rock fragments of various dimension in sandy/silty soil matrix. In the north of the soil area a high erosion potential Kludra flows over semi consolidated slope forming material. Another small Chana flows in the eastern part in the semi consolidated material. The northwestern slope is subjected to instability due to these factors. Ground water seepage is also noticed in the area.

The area was partly visited during June 2007 and a report was submitted to HCCP administration. During that investigation visit, the expert opinion of hunting & trapping activities could not be established due to lack of knowledge of various position of hunter & Adivi (H). However, the damage due to ongoing road widening activities were well established. The development of cracks on majority of houses in ground and major change of house of Shri Purna Prasad Sharma



due to road widening activities and delay in providing adequate preventive measures in disturbed slope was reflected. Major cracks on the HCC building of Mr. T.R. Sharma & Shri. Indira Devi Sharma w/o Purna Ram Sharma was also mentioned.

During recent visit the HCC building of T.R. Sharma & Indira Devi Sharma were revisited and found the crack widened further.



In this area, HCCP is not strictly following the guidelines.

Appendix  
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Dark column cover and cracks of joint grade. The gully rocks are encounter at RD 7763m and RD 7162m. Under such situations the adverse impact of blasting and tunneling activities and vibration due heavy vehicular movement played major role in causing damages. The area below building of Khri T. S. Sharma falls with a high water region also.

**Raley Area :** In Raley area, a number of major cracks running inside



the hill with substantial damage to house of Mr. K. N. Khatriwara, PHD building and Kharla Thupa along road are worth mentioning. The parental house of Mr. K. N. Khatriwara which lies in close vicinity shows an sign of any distress through the house is more than 100 years old. After visualization of the geological set up of the area, the old house stands as stable area with burden of shallow depth and semi vertical rock discontinuity running NW SE, separates the area of disturbance. The area below rock exposure consists of thick soil over burden with gentle slope. The area appears to be free from ground water activity and no sign of adverse mechanical conditions.

1/10/2010

except thick sand (thickness is around 0.7m) and now estimated undisturbed till just sand. Deposition on northern flank of Ma. Khawwara's house body facilitates accumulation of water during rainy season. Around post office area HRT is estimate at a lateral distance of 100mts and vertical depth is above 250-300mts with thick fabrications of debris cover. Major cracks had developed recently on the agricultural land below road, which is persistent for considerable distance on the surface. The HRT is estimated at a depth of approx. 250 mts below the surface with unknown rock cover fa and overburden thickness.

Keeping in view of absence of instabilities in the past history, slope configuration and constituent of slope forming material, geological set up of the area, drainage pattern and absence of noticeable ground/water activities, the role of ongoing activities of KHPCC and vibration due to movement of heavy vehicles in the area are major cause of damages on houses and land.

**Lower Samdong :** The complaint regarding damage of houses, potato gun plant and drying of perennial water sources was investigated earlier also & report was submitted accordingly. In lower Samdong area (i.e. Samdong Bazar field) to Arulaya Mandir, the slope is gentle where Adit II passes at approximate depth of 50-100mts. After that slope becomes comparatively steep towards Singtam Dikong route and depth of Adit attains 200mts and joins with HRT. In the area HRT depth range is from 200mts to 290 mts. The over all area consists thin thick blanket of debris cover consisting of boulders and rock fragments of various dimensions in sandy soil matrix with clayey soil at the top. The rock cover is not known. Towards North-East, there runs East To West without major disturbances. The area appears to be free from any instability problems in the area.







The damages in the form of cracks in houses, CC & water, cemented ground, floor and wall of Sivalaya Mandir & cracks on natural gas plants are common in the area. These cracks are aligned parallel to each other.



The drying of perennial water source originated below Sivalaya Mandir was brought to notice during visits and found to be genuine.

During recent visit, the house of Mr. Hari Lal Khatwa was also shown. The house under construction suffered unusual type of damage. Although has been made in with the usual standard condition of work and appears to be free from noticeable weaknesses except some groundwater seepage on southern bank. The WFT penetrated to a depth of 27 meters in the area. The exact thickness of debris cover and rock cover is not known.

The overall area under consideration falls within gentle to moderate slope with thick pile of soil overburden and berlock are expected at great depth. The area appeared to be free from instabilities in the past. Keeping in view of slope configuration, absence of notable agent of instability and past history of area, overall geological set up of the area, nature of cracks developed on houses, gohar gas plant and on ground, drying of perennial water sources, and predicted response of slope forming materials during blasting at contact zone between rock & overlying slope forming material, the disturbance as reflected on the surface and structures are mainly due to ongoing activities of NHPC (Tunneling & Blasting). The minor crack on building along road section is due to plying of heavy vehicles in the area and over all stability condition of the area.

Taking in account of geological set up of the area and its response to ongoing activities (Tunneling & Blasting) besides vibration due to other sources and also road widening activities, undersign foresee increase in subsidence and slides in future till natural equilibrium is fully met in several stretches between Dera Durr & Durr area (particularly between Hakey and Kakeley area).

### Management & Disposal of Spoils

Marshall Simpson, a spoils generator from United States Army Corps of Engineers, says that in the past, down stream areas fill with the spoils from the dam. This is due to increased silt load and consequently, greater power of river flows during heavy flood levels after environmental disturbances.



There are significant differences between the two types of river flows. The first type of flow is a flood, which is a temporary increase in the volume of water in the river. The second type of flow is a steady flow, which is a constant volume of water in the river. The first type of flow is caused by heavy rain or snow melt, while the second type of flow is caused by the dam. The first type of flow is dangerous because it can cause flooding and damage to property. The second type of flow is dangerous because it can cause the dam to fail and release a large amount of water.



Chances of something of this size also being due to falling of heavy-lift spoils (remnants of failure) are clearly visible on the photographs. Practice of dumping of spoils on flood beds of river is not conventional in such project and such action has to be taken for appropriate future compensation for causing such disaster in future.



Further, regarding environmental and socioeconomic deterioration in regions that suffered an environmental impact, we would like to know possible problems in the area.

A. K. Sharma  
and Dinesh Chandra

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# ENERGY & POWER SECTOR Vision 2015



ENERGY & POWER DEPARTMENT  
GOVERNMENT OF SIKKIM

## ANNEXURE - (II)

Table 1.1: List of projects selected (August 2010)

Sl. No	Name of Project	Installed Capacity (MW)	Name of the Developer	Date of MOU
1	Teesa Stage-I HEP	280	Hindustan Green Energy Pvt. Limited	08.12.2008
2	Teesa Stage-II HEP	300	Pen Upa Infra Pvt. Ltd.	01.20.2008
3	Teesa Stage-III HEP	1200	Teesa Dye Limited	26.07.2006
4	Teesa Stage-IV HEP	520	NHPC Ltd.	01.03.2006
5	Teesa Stage-V HEP	500	Lanco Energy Pvt. Ltd.	07.12.2008
6	Lanthe HEP	270	NHPC Limited	01.03.2006
7	Manu HEP	300	Hindal Hydro Energy Pvt. Ltd.	05.12.2008
8	Bonguchi HEP	36	Madhya Bharat Power Corporation	01.03.2006
9	Saha-Margda HEP	71	Sak Infrastructures Ltd.	01.03.2006
10	Chaudhari HEP	50	Sak Infrastructures Ltd.	14.11.2009
11	Bhawan HEP	51	Govt. Infrastructures Ltd.	14.12.2008
12	Pargu-H HEP	66	Bakim Hydro Venture Ltd.	14.12.2008
13	Pargu-IV HEP	120	Jai Power Corporation Ltd.	48.12.2005
14	Dichu HEP	46	Sarda Kanto Power Projects Ltd.	01.03.2006
15	Jetham Ling HEP	36	DANS Energy Pvt. Ltd.	05.12.2008
16	Lachung HEP	90	Lachung Power Pvt. Ltd.	18.01.2008
17	Banyang HEP	50	Tungo Power Pvt. Ltd.	18.01.2008
18	Box HEP	98	Changling Power Pvt. Ltd.	18.01.2008
19	Ting Ting HEP	99	T.T. Energy Pvt. Ltd.	03.09.2008
20	Teesa - V HEP	530	NHPC Ltd.	Completed & commissioned
21	Lanthe HEP	97	Sign Energy Pvt. Ltd.	03.04.2008
22	Lethang HEP	95	HPS Lethang Hydro Project Pvt. Limited	05.11.2008
23	Sunkhya HEP	30	Sarda PowerTech Pvt. Limited	15.12.2008
24	Pargu III HEP	60	NHPC Limited	Completed & Commissioned
25	Manu Khola - II HEP	60	Purnima Power Pvt. Limited	Yet to be signed

ANNEXURE - III

Sl. No	Name of Project	Status of DPR	Status of Techno-Economic Characteristics	Status of Environment Clearance	Status of Forest Clearance	Status of Land Acquisition	Status of Project Cost/benefit analysis	Expected Date of Commissioning
1	Tanaka Stage-1 220 MW	Yes to the date.	Yes to the clearance	Not Cleared	Not cleared	Yes to the acquired	Yes to the report	2016-17
2	Tanaka Stage-II 320 MW	Yes to the stage	Yes to the observed	Not Cleared	Not cleared	Yes to the finished	Yes to the cost-benefit	2016-18
3	Tanaka Stage-III 1200 MW	Completed	Disputed	(Hearings)	Cleared	Actual	Cost/benefit report to be ready	January 2018
4	Tanaka Stage-IV 320 MW	Completed	Cleared	Under Process	Under Process	Yes to the prepared	Yes to the audit	2016-19
5	Tanaka Stage-V 220 MW	Completed	Cleared	Cleared	Cleared	Actual	Cost/benefit report to be ready	November 2017
6	Tanaka Stage-VI 210 MW	Yes to the prepared	Not observed	Not Cleared	Not Cleared	Yes to the submitted	Yes to the report	2016-17
7	Parvati HEF 220 MW	Completed	Under Process	Disputed	Cleared	Actual	Cost/benefit report to be ready	September 2016
8	Parvati HEF 220 MW	Completed	Cleared	Cleared	Cleared	Actual	Cost/benefit report to be ready	September 2016



#	State	Completed	Disputed	Outstanding	Under Process	Yet to be acquired	Yet to start	March 2014
9	Madhya Pradesh HEP 71 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	February 2011
10	Chhattisgarh HEP 100 MW	Completed	Disputed	Outstanding	Completed	Under Process	Pre construction work started	March 2013
11	Bihar HEP 31 MW	Completed	Disputed	Outstanding	Completed	Acquired	Pre construction work started	June 2014
12	Madhya Pradesh HEP 66 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	June 2014
13	Uttar Pradesh HEP 120 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	December 2014
14	Uttar Pradesh HEP 90 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	December 2014
15	Uttar Pradesh HEP 100 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	December 2014
16	Uttar Pradesh HEP 90 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	December 2014
17	Uttar Pradesh HEP 90 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	December 2014
18	Uttar Pradesh HEP 90 MW	Completed	Disputed	Outstanding	Completed	Acquired	Construction work in full swing	December 2014

19	Tung Tung HEP 50 MW	Completed	Completed	Completed	Completed	Yet to be acquired	Yet to start	December 2013
20	Tonla Stage-V HEP 316 MW	Project already completed & commissioned						
21	Tanigang HEP 97 MW	Completed	Delayed	Completed	Completed	Under process	Yet to start	September 2013
22	Leftang HEP 68 MW	Completed	Delayed	Completed	Under Process	Under Process	Yet to start	October 2014
23	Gumiofoc HEP 30 MW	Under preparation	Yet to be initiated	Yet to be initiated	Yet to be approved	Yet to be approved	Yet to start	2014-15
24	Kuhir Khula-II HEP 100 MW	Under preparation	Yet to be initiated	Yet to be initiated	Yet to be approved	Yet to be approved	Yet to start	2014-15
25	Phangla III 60 MW	Project already completed & commissioned						



# ANNEXURES



# GEOLOGICAL ANALYSES OF THE TEESTA BASIN OF SIKKIM

## Introduction

Sikkim is a small Himalayan state in north-east India situated between 27°00'46'' to 28° 07'48'' N latitude and 88° 00'58'' to 88° 55'2''E longitude with geographical area of 7,096 sq km constituting only 0.22% of total geographical area of India. It has a human population of 5,40,493 as per Census, 2001 which constitutes only 0.05% of India's total population.

The state is bound in the north by Tibetan plateau, by China (Tibet) on the northeast, by Pangola range of Bhutan on the southeast, by Darjeeling district of West Bengal on the south and Singalila range and Mt. Khangchendzonga on the west and northwest.

The state of Sikkim has been administratively divided into four districts viz. North Sikkim, South Sikkim, East Sikkim and West Sikkim using water divides of major and minor tributaries of Teesta river as criteria. North Sikkim is the largest district with an area of 4,226 sq km constituting about 60% of the entire state. The West, East and South districts constitute about 16%, 13% and 11% of the geographical area of the state, respectively. The state capital is located at Gangtok in East Sikkim. Each district has been further divided into two sub-divisions each, except East Sikkim, which has been divided into three sub-divisions. All the districts together have 407 revenue blocks and 42 forest blocks. East Sikkim is the most populated district having 45.29% of state's total population and North Sikkim is the least populated with 7.59% of the total human population.

Sikkim is very rich in natural resources, flora and fauna, culture and tradition showcased in a varied rugged topographical and geographical terrain. Sikkim is endowed with the world's third highest mountain peak Mt. Khangchendzonga flanked by majestic mountain peaks such as Sinolchu, Talung, Kabru, Pandim, Gurudokmar, Simvo, Mt. Narsing and many

exalting snowcapped mountains and hills. The Zemu glacier and numerous big and small glaciers, snow melt, monsoon shower and small streams are another source of water volume of the Great Teesta. There are a large number of water bodies distributed throughout the State in the form of fresh water lakes and streams.

## Physical features

Sikkim state being a part of inner mountain ranges of Himalaya is entirely hilly, having no plain area with altitude varying from 213 m in the south at Melli Bazar to above 8,500 m (Mt. Khangchendzonga: 8,598 m) in the north-west and northeast (Pauhunri: 7,056 m). *The human habitable areas are limited only up to the altitude of 2,100 m constituting only 20% of the total area of the state.* North Sikkim, which is deeply cut into escarpments, is the least populated with a population density of 9.7 persons/sq km only. The habitation at higher altitudes exists mainly in Lachen and Lachung valleys comprising the upper catchment of Teesta River. The population, however, is concentrated in lower altitude habitations, viz. Mangan, Singhik, Chungthang etc. North Sikkim is endowed with a number of glaciers that descend from the eastern slopes of Khangchendzonga and western slopes of Pauhunri. Zemu glacier located in North Sikkim is one of the largest glaciers in India with a total length of about 25 km. This high altitude district forms the upper Teesta basin and is endowed with a number of glacial lakes of various sizes and shapes. Prominent among them are Chho Lhamo, Gurudongmar Chho, Lhonak Chho, Green Lake and Khangchung Chho. Other important lakes in the state are Chhangu and Kupup lakes in East Sikkim and Khecheopalri in West Sikkim. *More than 43% of Teesta basin in Sikkim is characterized by very steep slopes and escarpments i.e. more than 43% of its geographical area lies in more than 50% slope category.*

The landforms and drainage of Teesta river are characterized mainly by the four-tiered terraces, canyons or gorge-valleys at different altitudes, asymmetric valleys, polyprofiling U-shaped valleys and steps or troughs, lakes, alluvial cones, truncated ridge-spurs, terracettes (soil landscape systems), rectangular-barbed-parallel-trellis-radial to subdendritic drainage patterns, straight to meandering and braided channels. *All these physiographic features are indicative of active processes of weathering, denudation and deposition making the area physically very sensitive.*

The geomorphological characteristics of Teesta basin are identified in detail from the base map prepared from the merged scenes of IRS-1D LISS-III, PAN and SOI toposheets at 1:50,000 scale covering entire Teesta basin in Sikkim. Ten broad landforms could be identified in the basin. These are ridge, rocky cliff, escarpment, landslide zone, morainic zone, low mountain (1,000 m), narrow valley, middle mountain (1,000 - 2,000 m), high mountain (2,000 - 3,000 m), very high mountain (3,000 - 4,000 m) and extremely high mountain (> 4,000 m) along with glaciers. The ruggedness of terrain in Teesta basin is evident from 22% of the total basin area is comprised of very high mountains, and as much as 16% area is under perpetual snow. Escarpment and narrow valleys comprise more than 3% of the total catchment area.

### **Relief and aspect**

The elevation in Teesta basin varies from 213 m to 8,598 m within distance of about 100 km. The river descends from 5,280 m up to the confluence with Rangeet river at Melli Bazar along its traverse of about 175 km. Therefore, the river flows in a gradient of about 29 m/km. Nearly 1/4th of the basin area lies in the elevation range of 4,000 to 5,000 m (Fig. 1). As more than 59% of the catchment area of Teesta basin lies above 3,000 m, Teesta basin in Sikkim, therefore, can be classified as high altitude basin. Even the area between 2,000 and 3,000 m elevation range constitutes 16% of the total basin area. Only 25% of the catchment area lies below 2,000 m, whereas sub-tropical elevation constitutes only 6% of the basin.

The predominant aspect in the basin is southern aspect followed by eastern aspects. Only 16% of the mountain slopes are north facing.

### **Slope**

As already discussed, the altitudes from 213 m to 8,598 m within an aerial distance of about 100 km, the catchment of Teesta river basin in Sikkim is characterised by steep to very very steep slopes (Fig.2). As evident from the figure, more than 52% of the basin lies in slope category above 27° i.e. steep to very very steep slope class. As much as 10.32% of the catchment area is either rocky cliffs or are escarpments i.e. 65° and above slope class. The catchment area under moderately steep slopes category is only 8.61% of the total. About 4.37% of the basin has area of gentle slope category.



Maximum area under gentle slope category is recorded in Zemu valley followed by Chhombo Chhu, both incidentally are the main sources of water in Teesta river. Zemu valley is characterized by 25 km long Zemu glacier descending from Khangchendzonga peak with steep to moderately steep in the initial stages and gentle gradient in the most of its stretch. Chhombo Chhu also is characterized by wide U-shaped glacial valley with moderately steep to gentle gradient slope near the source of Teesta river up to its confluence with Gayum Chho near Oakra.

### Geomorphic profile of Teesta Basin

The terraces and floodplains, valley-side slopes and landslide slopes, alluvial cones of different types and generations, tors, kettle shaped depressions, terrace-isles, sickle shaped ranges bevelled plains, undulating plains and deeply-dissected valleys, glacial or periglacial deposits, related sedimentary structures, crevasses etc. are the distinctive geomorphological features of Teesta river basin in Sikkim. *The landforms and landform assemblages in the terrain of Teesta river basin and its innumerable tributaries are the result of continuous denudation and deposition processes that are constantly modifying the newly-formed land forms in the upper reaches and burying the existing land forms in the lower reaches.* Based upon the geomorphological features as well as ecological and climatic regimes, Teesta basin in Sikkim can be demarcated into five distinct geo-eco-climatic zones viz.

- i) Frigid zone above 4,000m (glacial, periglacial and fluvio-glacial processes)
- ii) Cold zone between 2,500 and 4,000m (periglacial, fluvio-glacial and fluvial processes at higher altitudes),
- iii) Cold temperate zone between 2,000 and 2,500m in (fluvio-glacial, and fluvial processes at higher altitudes),
- iv) Warm temperate zone between 1,000 and 2,000m (fluvial processes), and
- v) Sub-tropical zone up to 1,000m (fluvial processes at lower altitudes).

First three eco-climatic zones jointly constitute the major part of North Sikkim district comprised of Upper Teesta basin and stretches for about 100 km from east to west. This portion is marked by innumerable glaciers

and glacial lakes, alpine meadows, deodar-oak, birch-rhododendron and juniper forests (sub-alpine to alpine forest), terraces along the Teesta river and numerous tributary valleys of varied origin and valley-aspects harbouring rich floral and faunal wealth. This northern part of Teesta basin with varied and diverse environments is responsible for unique and conspicuous landforms within the Teesta river basin. The glaciated areas in this part are engaged in the erosional activities through abrasion scouring, frost action, freeze-thaw cycle etc. Upper Teesta basin is also characterized by huge accumulation of debris in the form of debris cones, rock-glaciers and alluvial fans, debris avalanches and other hazards. This debris is transported mainly in monsoon season and during snowmelt period. Transportation rates of these debris become 20 times than normal during any catastrophic event. The watersheds located in the Upper Teesta basin contribute huge amounts of silt. The movement of glaciers over their beds, reduce the rock surface to rock flour by their frictional activity. The rock flour after mixing with melt-water forms the glacial milk, which ultimately transformed into thin mud during peak melt discharge. The changes in glacial-phase of the Upper Teesta basin section require special attention in planning for watershed management, especially landslide and flood control in lower reaches. The fluctuations in ice-cover in this region are generally accompanied by:

- i) Production and transport of debris,
- ii) Floods and siltation of reservoirs,
- iii) Vegetation cover, and
- iv) Associated cooling effects of the glaciers in Sikkim Himalaya.

*Therefore, the fluctuations in such activities in the Upper Teesta basin are required to be monitored and evaluated for the formulation of any precautionary and mitigative measures.*

The factors like orientation of slopes, precipitation along with other local aspects have given rise to intra-valley variation in the elevation of snowline in the Upper Teesta basin. The south facing slopes have a lesser ice-cover.

Middle and lower parts of the basin are marked by subdued relief, slope-wash slides and slips, scourge and filling, abandoned channels etc.

## Hydro-meteorology

Teesta basin is characterised by frequent occurrence of extreme (catastrophic) meteorological events during monsoon season. These events lead to slope transformation accompanied with gravitation, slope wash and linear erosion under fluvo-glacial environment in North Sikkim and are mainly responsible for large quantities of silt and aggradation material, which is deposited in river channels. The high rainfall (about 2,300 mm) over the steeper slopes has created a suitable environment for initiation of run-off and subsequent soil-erosion, slope failures, slides or sinking of land-masses in Teesta basin. Large slope areas are (glacial) morainic in nature.

Variation in altitudinal profile of the state from 213 m to 8,598 m in less than 100 km is responsible for abrupt changes in climatic conditions in the basin and the state. Relief features such as high mountains act as a barrier for the movement of monsoon winds resulting in a significant variation in rainfall and temperature profiles across the Teesta basin in Sikkim.

March, April and May are the transition months between the winter, summer and monsoon. The surface temperatures start rising in late April, which are accompanied by thunderstorms and hails. The rainfall in Sikkim, decreases with elevation after a certain limit. Rainfall at Chungthang (1,600 m) is 2,650 mm and at Lachen (2,730 m) being situated at a distance of only about 20 km north of Chungthang is 1,680 mm, whereas Thangu (3,800 m), located about 20 km further north, receives only 840 mm of rain annually. As a result, across the altitudinal gradient of Teesta basin, the southern and middle valleys are hot humid and wet, while northern parts are comparatively drier and cold. The climate of Teesta basin in Sikkim can be categorised into four distinct seasons viz. i) Winter season from mid-November to mid April, ii) Spring (summer equivalent) season from mid-April to mid-June, iii) Monsoon season from mid-June to mid-September, and iv) Autumn season from mid-September to mid-November.

Data collected by Department of Meteorology shows that the flow of water in Teesta River is as below:

1973 – 4870 cusec – max flood

1993 – 2235 cusec – max flood

1994 – 1359 cusec - max flood

This shows the Teesta River is drying up. With this effect, generation of power will also be proportionately become less and less. Annually, the turbine and other machines' efficiency will decrease. Result – after 30/35 years, there will be hardly any generation of electricity. The whole economy based on such wrong calculations will bring disaster of unprecedented nature. The soil all around Teesta basin will become arid with no water sources for irrigation, agriculture, drinking and vegetation cover.

## River Teesta

The river Teesta is one of the main Himalayan rivers that originates from the glaciers of Sikkim in North at an elevation of about 5,280 m. The river rises in mountainous terrain in extreme north as Chhombo Chhu, which flows eastward and then southward to be joined by Zemu Chhu, upstream of Lachen village near Zema. The river takes a gentle turn in southeast direction and meets Lachung Chhu at Chungthang where it takes the form of a mighty Himalayan river. Teesta, therefore, is the main river of the state with its several tributaries viz. Zemu Chhu, Lachung Chhu, Rangyong Chhu, Dik Chhu, Rani Khola, Rangpo Chhu and Rangeet river and constitutes an extremely important resource of the state.

After the confluence of Teesta river and Lachung Chhu at Chungthang, the river gradually widens and takes a strong westward turn upstream of Tong and after flowing down to Singhik, the river drops from 1,550 m to 750 m. At Singhik, the river receives one of its major tributaries, Rangyong Chhu on its right bank, which originates from the Talung glacier, a part of the Khangchendzonga mountain range. From Singhik, the river flows southwards to Dikchu with a 200 m drop through a very deep valley for about 30 km. From Dikchu onwards, the river takes many sharp and wide curves and flows down to Singtam with a further drop of about 200m. Rangpo Chhu, which drains the Chhangu lake area in East Sikkim joins Teesta river on its left bank at Rangpo. Downstream of Rangpo, Teesta river widens and is joined by Rangeet river at Melli Bazar on Sikkim-West Bengal border. From Melli Bazar downstream, the river leaves the hilly terrain and enters the plains of West Bengal at Sevoke near Siliguri. Teesta river ultimately drains into Brahmaputra at Teestamukh Ghat (Kamarjani-Bahadurabad in Rangpu district of Bangladesh) and traverses

a distance of about 400 km from its origin.

*Teesta and most of its tributaries are flashy mountain rivers and carry boulders and considerable quantity of sediment. The flow is turbulent characterised by high velocities. Throughout its course in Sikkim, Teesta and its tributaries flow in very narrow and deep valleys having precipitous hill slopes, except where the tributaries join the mainstream. The hill slopes are mostly friable and landslips are very common throughout the basin.*

The river passes through the cold desert of Chho Lhamu, Lachen valley and joins Lachung chu at Chungthang and continuously flows down through the deep gorges of Toong, Naga Singhik and meets another glacial river from Khanchendzonga at Namprikdang Dzongu forming a confluence of Teesta Kanaka Khola. The volume and dimension of Teesta River further increase by almost half of its size. Further, it passes through the rugged terrains in the Dzongu valley at Sangkalang, Heegyathang and Lower Dzongu at Phidang and joins Dikchu in East Sikkim at a distance of 1.5 km away from the site of Teesta Stage V Dam. It then joins another big river Rongni Chu at Singtam and Rangpo Chu at Rangpo at the Border with West Bengal. It flows down the drain on the right flank supported by Sikkim hills and left bank by West Bengal and finally leaves Sikkim by joining the other big river Rangeet at Melli confluence and seams in the plains of West Bengal.

The river meandering between the rough and rugged boulder beds, plains of cold desert lands and at places it forms waterfalls. The nature of river varies from very gentle flow, to a sudden fury and ceaseless cascade falls. As winter months set in, the volume of river remains clean, clear and blue. As monsoon starts in, entire countenance of the river transforms into full of fury, muddy, rough carrying boulders, sediments, silts and it is difficult to fathom its nature.

Three prominent knickpoints have been observed along the Teesta river profiles, corresponding to the zones of tectonic discontinuities, the important ones being the MCT and MBT (Seeber and Gornitz: 1983). In the north, the catchment of the Teesta basin is mostly glaciated terrain.

## **Watersheds of Teesta Basin in Sikkim**

The main Teesta while flowing from north to south divides the state into two parts. Teesta drainage basin cover an area of 7,020.38 sq km of Sik-

kim and 75.32 sq km of the state is under Jaldhaka river watershed, which is not the part of Teesta basin. To understand the profile and behaviour of prominent tributaries of Teesta river basin in Sikkim, Teesta basin was divided into its major tributary watersheds. The entire Teesta basin falling has been delineated into 17 watersheds following the conventional methodology of delineation based upon drainage order classification. These watersheds vary in size and shape depending upon the drainage pattern in a particular watershed.

The analysis of entire data was done watershed-wise e.g. slope, relief, draining pattern, landuse and soil etc. The results, therefore, are also presented watershed-wise. The seventeen watersheds are : i) Rangpo Chhu, ii) Rani Khola (Rongni Chhu), iii) Teesta (Lower Part), iv) Dik Chhu, v) Lachung Chhu, vi) Yumthang Chhu, vii) Chhombo Chhu, viii) Zemu Chhu, ix) Rangyong Chhu (Tolung Chhu), x) Lachen Chhu, xi) Prek Chhu, xii) Rel Chhu, xiii) Rathang Chhu, xiv) Kalej Khola, xv) Ramam Khola, xvi) Rangeet river and xvii) Manpur Khola. Jaldhaka river watershed drains into West Bengal and is not the part of Teesta basin.

Soils of 17 watersheds in Teesta basin in Sikkim can be mapped at the level of soil series association. A total of 62 soil series have been identified and mapped into 63 soil-mapping units (1:50,000 scale) through the soil resource inventory of the Teesta basin in Sikkim. (Table-1 Fig-4)

**Table 1- Landforms *vis-à-vis* soils in Teesta basin in Sikkim**

Landform Region	Landform Units	Soil series association	Soil map unit
Ridge	1	Maling-Rayong	1
	2	Rubam – Salem	2
Rocky cliff	3	Rock outcrops – Jorpul	3
Escarpments	4, 5	Hilley-Singrep – Chatten	4
	6, 7	Bhusuk- Karporang – Tibik	5
Landslide zone	8, 9	Karporang – Hilley	6
Morrainic zone	10, 11, 12	Kalep – Rock outcrop	7
Low mountain (<1000m)	13, 14	Bhasme–Chautare–Legship	8

>50 % slope		Singhik – Lingthem	9
Low mountain (<1000m)	15, 16	Chalumthang – Rorethang – Bhasme	10
(30-50) % slope	17, 19, 20	Mangjing – Singrep - Rorethang	11
	18	Lingtse – Chautare – Chalumthang	12
Low mountain (< 1000m)	21	Mangjing – Dharamdin	13
(15-30) % slope	22, 23	Dharamdin – Lingtse - Karfacter	14
Narrow valley (8-15)% slope	24	Mangreng – Karfacter-Mangjing	15
Mid-mountain (1000-2000 m)	25	Tumin –Phong – Chautare	16
>50% slope		Chatten-Theng	17
	26	Phong – Khedi – Maniram	18
		Pakel – Tibik – Rock outcrop	19
	27	Chakung – Tumin – Sajong	20
		Singhik – Tibik – Lingthem	21
	28	Chongrang – Legship – Singgyang	22
		Singhik – Ruglo – Rapung	23
Mid-mountain (1000-2000 m)	29	Doling – Khedi	24
(30-50)% slope		Gyer – Manul – Lema	25
	30	Dikling – Hilley	26
		Nung – Lingthem	27
	31, 33	Samdur – Khedi – Bhusuk	28
		Lingthem – Lema – Singhik	29
	32	Rumtek – Tumin	30
		Bitchu – Ruglo – Pakel	31
	34, 36	Bhusuk – Pirik – Namchi	32

		Manul – Gyer – Rock outcrop	33
	35	Namchi– Synggyang	34
		Ruglo – Lingthem – Theng	35
	37	Doling – Samdur – Rock outcrop	36
		Singhik- Pakel	37
		Singhik- Pakel	37
Mid-mountain (1000-2000m)	38, 39	Rumtek – Pirik – Mangjing	38
(15-30) % slope	40, 41	Daragoan – Gaucharan – Dharamdin	39
Mid-mountain (1000-2000m)	42	Dharamdin – Martam - Karfeter	40
(<15% slope)		Mensithang – Lema – Bitchu	41
High mountain (2000-3000m)	43	Damthang – Chongrang – Rock outcrop	42
> 50% slope		Tibik-Byuma – Mensithang	43
	44	Singgyang – Maniram – Damthang	44
		Chatten-Lema – Tibik	45
	45, 46, 47	Maniram-Damthang – Jor-pul	46
		Ship – Theng – Pakel	47
High mountain (2000-3000m)	48	Martam – Tarnu – Sajong	48
(30- 50)% slope		Rapung – Mensithang – Rock outcrop	49
	49	Sajong –Tarnu	50
		Tibik – Bitchu – Rock outcrop	51
	50	Khedi – Maniram – Rong-nek	52
		Bitchu – Lachen – Chatten	53



	51	Rongnek – Sajong	54
		Ship – Lingthem – Rock outcrop	55
	52	Khedi – Dikling	56
		Byuma-Ship	57
High mountain (2000-3000m)	53	Gaucharan – Tarnu	58
(15-30)% slope		Yumthang – Bitchu	59
Very high mountain (3000-4000m)	54, 55, 58	Lachung- Puchikongma - Byuma	60
(30-50)% slope	56, 57	Yumthang – Thangu – Kalep	61
	59	Maltin – Lachen – Rock outcrop	62
Extremely high mountain	60, 61, 62, 63, 64	Thangu – Rock outcrop	63
(30-50)% slope			
Glacier			G

## Soils of catchment

The soils of catchment area as reported are limited to a few orders, like – Entisol, Inceptisol and Molisol and are in the process of new soil formation. In most of the areas, soils are in order of Inceptisol, Umbric or Typic moisture regime. The soil texture classes vary from fine loamy, coarse loamy to fine loamy, coarse loamy stones, coarse loamy, loamy and silty loamy with depth varying from moderate, deep moderate, moderate deep, moderate skeletal within 7-8 locations of the catchment area. The soil pH value varies from 4.1-6.6 in some places. The organic carbon matter of soil at Rangrang, Dikchu has the lower component, but lower Namok at the same level appears high.

The distribution of Nitrogen was medium almost throughout watershed; Phosphate availability is limited in acidic soil. The Potash availability indicated low to medium in most case. *The over all soil fertility status indicated medium Nitrogen, Phosphate and low to medium Potash considering the soil ingredient and mineral and chemical component.*

The main landslide, soil erosion prone zone and a large number of

nallahs and natural Jhoras running from both side of the main drain the Teesta River. *Almost all the natural Jhoras, nallahs and artificial nallahs are created due to extensive road construction within the catchment.*

## Geological setting

The regional geological set-up of the Sikkim Himalaya is best displayed in the form of Teesta gorge, flowing in general from north to south. The Central Crystallines represented by a sequence of high grade meta-sedimentaries (calc-granulites, schist, quartzite), gneisses/migmatites and a number of granitic intrusions are exposed in the Axial Zone of North Sikkim. The Central Crystalline rocks are separated from the gneisses and schists (Darjeeling gneiss and Daling Group) in the south by a prominent dislocation zone, namely the *Main Central Thrust, which is an important tectonic feature or activity all along the Himalaya*. The foothills in southern part of Teesta basin are characterised by low-grade pelite-psammite assemblage (Dalings) followed by alternate sequence of the sandstone shale-coal assemblage (Gondwana) occurring with prominent structural dislocations in between. Further south, the Gondwana rocks are separated tectonically from the Shiwaliks by the Main Boundary Fault. There is no recorded event of macro- and/or micro-seismicity in North Sikkim, though it is characterised by natural hazards like landslides. *The area south of MCT is highly vulnerable to earthquakes*. As per the revised Seismic Zoning Map of India, the state of Sikkim lies in the seismic zone classified as Zone-IV.

## Geology

Sikkim Himalaya has been sub-divided into distinct geotectonic domains like other sectors, which are separated from one another by thrust faults. They are described as follows:

### i) Sub-Himalayan Domain

This domain lies in the south and consists of mollase type deposits of the Siwaliks (Mio-Pliocene), and is separated from the lesser Himalayan domain (LHD) in the north by the Main Boundary Thrust (MBT).

### ii) The Lesser Himalayan Domain

The LHD consists of a thin strip of Gondwana rocks (Carboniferous-

Permian), carbonate rocks (Buxa Formation) and a thick metasedimentary sequence of dominantly pelites with subordinate psammite and wacke (Daling Group).

### iii) Higher Himalayan Domain

The higher Himalayan domain (HHD) overlies the LHD and is composed of medium to high-grade crystalline rocks, commonly referred to as the higher Himalayan crystallines (HHC). These are dominantly of pelitic composition, with sporadic quartzites, calc-silicate rocks, metabasites and small bodies of granite. The HHC is separated from the lesser Himalaya by the Main Central Thrust (MCT). The exact location of this thrust has been controversial in many areas, including Sikkim (Lal *et. al.* 1981; Sinha-Roy, 1982).

### iv) The Tethyan Belt

A thick pile of fossiliferous Cambrian to Eocene sedimentary rocks belonging to the Tethyan Belt (Tethyan Sedimentary Sequence) overlie the HHC on the hanging wall side of a series of north-dipping normal faults constituting the South Tibetan Detachment System (STDS) in the extreme north of Sikkim.

## Stratigraphy

A comprehensive stratigraphic framework along a south-north traverse from the foothills of Darjeeling-Himalaya to the northernmost part of the Sikkim Himalaya is established by Ray (1989), and shown in Table 2. The repetitive nature of the three units, namely – the Gorubathan, the Reyang and the Buxa of the Daling Group as also the two units, the Rangeet Pebble Slate and the Damuda of the Gondwana Group, within a tectonic section has been shown from Darjeeling-Sikkim Himalaya.

**Table 2: Tectonostratigraphic Succession along South-North Darjeeling-Sikkim Himalayan Section (after Ray, 1989, GSI, 2000)**

	NORTH
TETHYAN GROUP	4. Chho Lhamo Formation
	3. Lachi Formation

## Mt. Everest Limestone

## 1. Mt. Everest Pelitic Formation

## \_\_\_\_\_ TRANS-AXIAL TRUST \_\_\_\_\_

**SIKKIM GROUP**

Darjeeling Gneiss, Khangchendzonga  
Gneiss and Chhungthang

(=Paro) Subgroup with Lachen

Leucogranite (and its Equivalents)

\_\_\_\_\_ *SIKKIM (MAIN CENTRAL?) THRUST* \_\_\_\_\_**DALING GROUP**

Gorubathan Subgroup

(with Lingtse Granite Sheets at  
different Structural Levels)

(Syngenetic Fe-Cu-Pb-Zn  
Mineralisation)

\_\_\_\_\_ *KALET CHHU-LEGSHPH THRUST* \_\_\_\_\_**DALING GROUP**

Reyang Subgroup

Buxa Subgroup

Gondwana Group

Gorubathan Subgroup

\_\_\_\_\_ *PAJOK THRUST* \_\_\_\_\_

A Zone of pile of

thin scales of Daling Group

(Gorubathan-Reyang-Buxa Subgroups)

and Gondwana Group (Rangeet Pebble Slate –

Damuda Formations)

\_\_\_\_\_ *NORTH TATAPANI THRUST* \_\_\_\_\_**GONDWANA GROUP**

2. Damuda Formation

Rangeet Pebble Slate

**DALING GROUP**

3. Buxa Subgroup

2. Reyang Subgroup

## 1. Gorubathan Subgroup

\_\_\_\_\_ *NAYA BAZAR THRUST* \_\_\_\_\_

A Zone of Pile of thin Scales of

Daling Group (Gorubathan-Reyang-Buxa Subgroups)

and Gondwana Group (Rangeet Pebble Slate -

Damuda Formations)

\_\_\_\_\_ *KITAM-MANPUR KHOLA THRUST* \_\_\_\_\_**DALING GROUP**

## 2. Reyang Subgroup

Gorubathan Subgroup

\_\_\_\_\_ *SIM JHORA THRUST* \_\_\_\_\_**DALING GROUP**

Gorubathan Subgroup

(With Lingtse Granite Sheets)

\_\_\_ *NORTH DARJEELING (BARNESBERG-BADAMTAM)  
THRUST* \_\_\_**SIKKIM GROUP**

Chhungthang Subgroup,

Darjeeling Gneiss,

Khangchendzonga Gneiss (? Middle  
Cenozoic Pegmatite Aplite Formation  
and small Granite Bodies)\_\_\_\_\_ *SOUTH DARJEELING THRUST* \_\_\_\_\_**DALING GROUP**

Gorubathan Subgroup

(Intruded, Metasomatically Replaced  
and Technically Emplaced Lingtse  
Granite)(Syngenetic Fe-Cu-Pb-Zn  
Mineralisation)\_\_\_\_\_ *DEORALI-RONGCHONG THRUST* \_\_\_\_\_**DALING GROUP**

## 2. Reyang Subgroup

(with slices of Gorubathan Subgroup)

Gorubathan Subgroup

(with slices of Rangeet Pebble Slate and  
Damuda Formation in Basal Portion)

\_\_\_\_\_ *DALING THRUST* \_\_\_\_\_

**GONDWANA GROUP**

2. Damuda Formation

1. Rangeet Pebble Slate  
(Slices of Daling Group)

\_\_\_\_\_ *TINDHARIA THRUST* \_\_\_\_\_

**GONDWANA GROUP**

Damuda Formation

\_\_\_\_\_ *MAIN BOUNDARY THRUST (SOLE OF NAPPE)* \_\_\_\_\_

**SIWALIK GROUP**

2. Geabdat Formation

1. Chhunabhatti Formation  
(Intermixed with Damuda Slices  
in Rangtong Thrust)

\_\_\_\_\_ *RANGTONG (IMBRICATE) THRUST* \_\_\_\_\_

**SIWALIK GROUP**

3. Murti Boulder Bed

2. Parbu Grit

1. Geabdat Formation

\_\_\_\_\_ *UNCONFORMITY/FAULT* \_\_\_\_\_

**QUATERNARY GROUP**

Alluvium

Terrace Boulder Beds

SOUTH

## Structure, tectonics and metamorphism

A number of discrete linear zones of ductile deformation (DDZ) are seen in many localities. The DDZ cut across lithological boundaries and the planar fabric. S2 commonly seen in the gneissic layering that is defined by the alignment of biotite and silimanite grains (Neogi *et al.* 1998). These zones are narrow, characterised by intense mylonitization, formed late in the deformation history, and are associated with mineral lineations and stretching lineations. The stretching lineations generally plunge to the north. Shear sense indicators consistently indicate a top to- south sense

of movement. S-C fabrics associated with the top-to south transport are found within the gneisses in these zones (Neogi *et al.* 1998).

In the Sikkim, the Main Central Thrust (MCT) juxtaposes highgrade gneisses of the High Himalayan Crystalline (HHC), the Darjeeling series, over lower-grade slates, phyllites and schists of the Lesser Himalaya, the Daling Series (Catlos *et al.* 2002). Inverted metamorphism characterises rocks that underlie the MCT, and is described in the Sikkim region as a gradual increase in metamorphic intensity in the Daling series at lower topographic levels to the Darjeeling series at higher levels with no apparent break across the fault (e.g. Mallet, 1875; Ray, 1947). Because both increasing (Metcalf, 1993) and decreasing (Thakur, 1986; Lombardo *et al.* 1993) grades of metamorphism towards higher structural levels have been observed. The geological picture in the Higher Himalaya is rather confusing (Neogi *et al.* 1998). Numerous models have been proposed to account for the observed inverse metamorphic zonation in the Himalaya and a prominent role is assigned to the MCT in most of these models. The pressure gradient of 0.25 kbar/ km resembles a normal lithostatic gradient, which suggests that the HHC in Sikkim represent an inverted Barrovian sequence. This inverted zonation of the HHC is probably the result of large-scale structural inversion and/or tectonic juxtaposition, because of ductile shearing (Neogi *et al.* 1998).

The Darjeeling rocks are largely N-dipping, but locally domed to fold west, east and north (Hooker, 1854). Structurally, above these is the contact between the Darjeeling and Tethyan rocks, which in Sikkim has been reported from two places (Edwards *et al.* 2002, locations 1 and 2, Fig. 6). In NW Sikkim on Jonsang Kang (~7000m – location 1, see Fig.6) the northward dipping orthogranitic Khangchendzonga gneisses (part of the Darjeeling series) are structurally in contact with limestones (Dyhrenfurth, 1931). From the Lachi Spur (location 2, see Fig.6), Wager (1934) observed that the Permian Lachi series and a small sliver of the underlying Mt. Everest limestone are in 45°N dipping normal fault contact with –porphyroblastic feldspar– biotite gneiss (Wager, 1939). This appears to be the first accurate identification of the South Tibet Detachment System (STDS) (Catlos *et al.* 2002). The STDS and the trace of the Himalaya are monoclinally bent across the Chhumbi graben valley (the southern most part of the N-S Yadong-Gulu rift system) stepping north by ~40km to the east of this point (the Yadong Cross Structure) (Edwards *et al.* 2002).

The Dalings occupy large area of Teesta valley and form a dome below the Darjeeling gneiss. The Lingtse-granitoid gneiss occurs within the Daling Group of rocks. The contact between the Lingtse Granitoids with Dalings is controversial. The arcuate shape of the MCT in Sikkim is in conformity with the domal structure of the Higher Himalayan Crystalline. The MCT passes about 5 km east of Gangtok and crosses Teesta River near Manul. The E-W trending north dipping MBT crosses Teesta river near Kalijhora township.

Mercalli (MSK) scale intensity and horizontal force corresponding with seismic map zones of India are shown in Table 3. The area covered by Sikkim falls in zone-IV.

**Table 3: Seismic zones of India with corresponding MM (or MSK) scale intensity, Richter magnitude and horizontal force**

Seismic Zones of India	Hazard Intensity	MM (or MSK)	Richter Magnitude Intensity	Horizontal Force Coef.
II	Low Damage Risk Zone	VI	5.2	0.02
III	Moderate Damage Risk Zone	VII	6.0	0.04
IV	High Damage Risk Zone	VIII	6.7	0.05
V	Very High Damage Zone	IX and above	>7.4	0.08

## Isoseismal Zones

*Temporal variation of seismicity in the area shows that there is burst of earthquake for a year or two preceded by a quiet period of 3 to 4 years (Nath et al. 2000).* The Bihar-Nepal earthquake of 1988 was distinctly felt in Sikkim. According to National Earthquake Information Centre, USGS report this earthquake of 20<sup>th</sup> September, 1988 occurred at 23:09:09.5 PM. The epicenter was located at lat: 26.76° N and long: 86.62° E and the hypocentral depth estimated as 57km. The isoseismal VII passes through Gangtok town, in an approximately NE-SW direction (Fig. 7). Several buildings in Gangtok were badly damaged and the death toll went upto 1003.

## Micro-earthquake Surveys

Detailed micro-earthquake surveys were carried out in the Darjeeling Himalaya (De, 1996) and in the Sikkim Himalaya (De, 2000). Kayal (2001)



has provided a detailed interpretation of these studies. It is observed that the earthquakes are mostly clustered to the north of MBT, at a depth range of 10-40 km and majority of the earthquakes occurred below the plane of detachment.

Focal mechanism results suggest that the mosaic of active lineaments, forming conjugate shear planes, dominate the neo-tectonic deformation in the Nepal-Sikkim Himalaya and their foredeep (Dasgupta *et al.* 1987). The seismicity trend in the Sikkim Himalaya and its foredeep shows that the Teesta, Gangtok and Yamuna lineaments and the Goalpara wedge of the Shillong massif are seismically active. The devastating Monghyr earthquake of 1934 ( $M_b=8.4$ ), which claimed 11,000 lives, had its epicentral location some 60 km south of the MBT under the East Patna Graben, where a set of splay faults of the East Patna basement fault connect northward with the Arun lineament.

### **Tectonoclimatic signature in Sikkim Himalaya**

The valley-filled deposits of the Teesta river basin in Sikkim Himalaya show important tectonoclimatic imprints.

Studying the terrace sequence along ca. 65km stretch in the Teesta basin in Sikkim Himalaya from Mankha in the mountainous region to Sevoke in the piedmont region. Sinha Roy (1980) concluded that the glacial and periglacial landforms occur in the north-central part of the valley and abundant fluvial terraces occur in the lower stretches. He correlated the terrace tiers on the basis of relative elevation from the thalweg, and on the degree of weathering and soil development in the terrace deposits. This study indicates that between the Main Central Thrust (MCT) in the north and Main Boundary Thrust (MBT) in the south a three-tier terrace system in the Teesta basin is preserved. These landforms occur at several places between tributary confluences where the trunk valley is relatively wide. However, careful examination of this work indicates that:

- i) at Mankha the middle terrace is not preserved,
- ii) at Singtam the middle and lower terraces are not preserved,
- iii) at south Rangpo the middle terrace is absent, and
- iv) at Deorali the top terrace is not preserved.

*Moreover, a preliminary basin wide reconnaissance survey indicated that*

*the preserved three-tier terrace system at Sirwani is disturbed by H.E. Power project development and the terrace sections are now covered with debris derived from the powerhouse cavern. However, at Mangalbare, a three-tier terrace is well-preserved and as evident from the longitudinal section given in Sinha Roy (1980), this region lies upstream of a knickpoint which corresponds with the E-W fault to the south of Rabangla. Therefore, this terrace system has been examined along with the associated tributary fan deposits for the purpose of understanding climate/tectonic influences on their evolution and development.*

The terraces and floodplains, valley-side slopes and landslide slopes, alluvial cones of different generations, kettle shaped depressions, sickle-shaped ranges, levelled plains, undulating plains and deeply dissected valleys, glacial and periglacial deposits are some of the geomorphological features observed in the Teesta River basin in Sikkim (Mukhopadhyay, 1982). The landforms and their assemblages in the Teesta river basin and its innumerable tributaries are the result of climatic processes, tectonic deformation, denudation and deposition.

Five distinct geoclimatic zones viz. (i) frigid zone (above 4000m a.s.l.) with glacial, periglacial and fluvio-glacial processes, (ii) cold zone (between 2500 and 4000m a.s.l.) with periglacial, fluvio-glacial and fluvial processes, (iii) cold temperate zone (between 2000 and 2500m a.s.l.) with fluvio-glacial and fluvial processes, (iv) warm temperate zone (between 1000 and 2000m a.s.l.) with fluvial processes and (v) subtropical zone (up to 1000m a.s.l.) characterise the Teesta River catchment in Sikkim and Darjeeling Himalaya (Mukhopadhyay, 1982).

Climatic change is a fundamental process, which can result in remarkable variations in sediment supply and water discharge (Blum, 1993; Vandenberghe, 1993, 2002; Vandenberghe et al., 1994; Pratt-Sitaula et al., 2003; Starkel, 2003). The other competing process is tectonics, including diverse aspects such as source-area uplift, valley-slope failure and vertical fault movement. Related aspects include fluvial avulsion and course adjustments, and base level change (Schumm, 1993; Goodbred, 2003). *The study of the lithofacies of the Quaternary alluvial sediments occur as distinct terrace and fan deposits in the middle Teesta valley in the belt between the Main Central Thrust and the Main Boundary Thrust in the Sikkim Himalaya distinctly indicates many tectonic evidences during their deposition with diversified climatic condition* (Climatic imprints in Quaternary valley fill

deposits of the middle Teesta valley, Sikkim Himalaya, Quaternary International 159: 2007)

## **Landslides in Teesta Basin**

The Sikkim Himalaya with rugged topography, ongoing seismic activity (by active tectonics) and heavy rainfall is subjected to intense landslide activities. The spurt of developmental activity in the region has led to substantial growth in the area affected by landslide activity. At places, old landslides have been stabilized, while at others new landslides have developed. At a few places, old landslides have been reactivated. Figure 8 shows the spatial disposition of landslides in Sikkim. This figure contains landslide scars from 1977 SOI toposheets (1:50,000) as old landslides and those interpreted from satellite data of recent times i.e. merged LISS and PAN scenes of 2002 as new landslides. Some of the reactivated landslide areas have been considered as new landslides. These data sets have several limitations and, therefore, may not give all the information related to landslide activity in Sikkim in spatial and temporal frameworks. However, these data provides a preliminary guideline on temporal change in landslide activity in Sikkim, which has been discussed below.

The number of new landslides outranks that of old landslides in most of the watersheds in Teesta basin. Teesta (Lower Part) watershed contains maximum number of new landslides. There are also large numbers of old landslide scars present in this watershed. In Prek Chhu, Rathang Chhu, Rangeet river, Rangpo Chhu and Ramam Khola watersheds more than 100 new landslide scars have been recorded. It is to be noted here that the rate of developmental activity in Teesta (Lower Part), Rangeet river and Rangpo Chhu watersheds is very high. In Rani Khola, watershed the number of new landslide scars are also higher compared to old landslide scars. Gangtok, the capital city of Sikkim, lies in this watershed. Over the years, this city has grown on the hill slope towards its fringe.

## **Some existing landslides in Sikkim**

Landslide is the pertinent natural problem, which is intensified manifold by human interferences, particularly in active mountainous regions like Sikkim Himalaya. Softer and incompetent rock formation, rocks that are hard, but incompetent due to fractures and joints, massive deforestation,

inadequate drainage, cultivation on steeper slopes, toe erosion by stream, heavy loading/construction of massive structures on unstable ground and seismicity of the region are some of the factors responsible for landslide. Rainfall intensity in Sikkim Himalaya has been observed to trigger landslide activity. In Sikkim, the roads are disrupted every year, especially during monsoon period, by landslides. The forests are also affected by landslide and erosion, which erode valuable forestland, destroy plantations and retards the growth of forest produce. The areas that are most affected are covered by softer rocks *viz.* phyllites and schists of Daling Group. However, the areas where harder schist and even gneisses occur are also affected to a minor extent. In these regions, the mica rich bands in the rocks lend the rock to massive failure.

### **Environmental impact of these slides**

Most of the landslides along the NH-31A, such as Rangpo slide in East Sikkim, disrupts the traffic. Similarly, the landslide complex between Mangan to Tong also disrupts the traffic on North Sikkim Highway every year. Due to dumping of material into the river the sediment flux in the rivers increases. Increase of sediment flux may have negative impacts on the aquatic ecosystem. Occasional blocking of the rivers may lead to flash floods. Some of the landslides affect the cultivable lands, thus leading to the wastage of productive soils. Some landslides in the city area, such as Tathangchen slide complex, damage houses and lead to loss of life. At places, particularly at the south of MCT, rock falls are observed during the earthquakes.

It is also very important to note here that many of the major landslides of Sikkim *viz.* North Rhenok Slide, Tathangchen-Chandmari slide, B2 slide, Chowang slide, Rangrang slide, Runchu slide, Narkhola and Karchi slide, Dentam-Uttare slides, Sombre slides lie in the region of MCT. The active landslides on the MCT are resulted due to the combined effects of i) road building, ii) heavy precipitation, and iii) seismic activity between MBT and MCT.

In the planning and implementation of projects in the hilly areas sustainable development must be given due importance. One aspect of sustainable development in a mountainous region is proper examination of the existing instabilities of the terrain and consideration of appropriate

development schemes, so that the resultant geo-environmental hazards are minimized. Therefore, systematic investigations need to be carried out on regional to local scales. Due attention must be given to the relationship between the attitude of lithounits and road alignments. For instance, a valley ward dipping bedding plane/foliation can lead to slope failure on the road side, while the road on the stable slope where the bedding/foliation plane dip into the hill, is never affected by landslide and subsequent blockage of traffic or death toll. Landslide hazard zonation map is to be prepared with an objective to delineate zones with different damage potential. This will help in planning and implementation of projects under the milieu of sustainable development.

## Flood problems

Flood problems in the predominantly hilly terrain of Sikkim are mainly that of inundation of marginal lands on low river terraces and erosion of land by rivers and hill streams. While the flooding due to over bank spills is not serious and is confined to isolated patches affecting a total area of 10,000 ha; land-erosion poses a serious threat to rural and urban population, strategic lines of communication, public utilities, agricultural lands, plantations, forests and mineral resources. Erosion of land has even more adverse effects on environment and ecology, not only in the affected areas, but also in the plains lower down where the heavy loads of debris are deposited in the river beds and flood plains aggravating the intensity of flood and disturbing the river regime.

The average annual damages due to floods in the state are as follow:

Area affected	= 0.01 mha (max 0.02 mha)
Population affected	= 0.005 million (max 0.1 million)
Damage to Crops	
Area	= 0.001 mha (max 0.02)
Value	= Rs. 0.415 crore (max Rs. 7.63 crore)
Damage to houses	
No.	= 427 (max 9746)
Value	= Rs.0.054 crore (max Rs. 1.83 crore)
Cattle Lost	= 91 (max 3260)

Human lives lost = 6 (max 107)

Damage to Public Utilities = Rs.1.94 crore (max Rs. 28.15 crore)

The above data does not include the damage to roads maintained by the Border Roads Organisation (BRO). *The enormity of the problem can be appreciated from the fact that they have to remove about 650 cum of debris every year per kilometre of road under their jurisdiction.*

## Glaciers

Glaciers are rivers of ice, and are dynamic systems sensitive to their surroundings and constantly change their shape and form. Glaciers are classified based on various criteria e.g. morphological (area-altitude), thermal (polar, temperate and sub-polar) and dynamic (active – maritime) environment at low latitudes. The glaciers of Sikkim occur as compound glaciers termed as glacier complexes where a number of glaciers originate from a common permanent ice covered region. Five glacier complexes, namely – Chhombo, Yumthang, Langpo, Zemu and Talung, are present in the Sikkim Himalaya (DPR, 2005). The glaciated upper Teesta basin is characterized by huge accumulation of debris in the form of debris cones, rock-glaciers and alluvial fans, and debris avalanches. Debris is transported mainly in the monsoon season and during snow-melt period. The middle and lower parts of the basin are marked by relatively subdued relief and slope-related slides and slips.

## Glacial erosion

Glacier erosion takes place due to abrasion and bodily moving rock fragments in the glacier mass. Direct evidence of erosion on bedrock is in the form of striae, grooves, smoothing, rounding and sharp truncation of internal rock structure. Large scenic features, e.g. – U-shaped and hanging valleys, glaciers steps, excavated lakes etc. Undercutting of steep slopes takes place by glacier sapping, and glacier milling takes place by circulation of melt-water in the glacier crevasses and depressions.

Glaciers have enormous capacity to transport rock debris. Generally, sediments move slowly with speed of 1m/d in ice mass, but transport over glacier margin, debris flow, running water and wind operate at much faster speed.

Depositional features, moraines, erratics outwash plains and trains, ground moraine sheets, drumlin and various ice content features e.g. Kettle holes, kames and esker. Glacio-aeolian deposits include sand dune sheets and mantle of loess (dust). Glacial lake deposits are used for dating palaeo-environment. Glacier lake outburst floods occur due to breaking of moraine or glacier dammed lakes.

Sikkim is a fully mountainous state of India, where the entire land is in the form of rugged terrain including mountains and hills. The central and northern mountain sectors are steeper than the southern sector.

The state is vulnerable to landslides and river erosion due to great elevation differences, steeply sloping terrain, and fragile geological conditions. In addition, the watersheds of the state are covered by some major glaciers and glacial lakes, which are quite susceptible to disastrous hazards due to Glacial Lake Outburst Floods (GLOFs). The glaciers, some of which consist of a huge amount of perpetual snow and ice, are found to create many glacial lakes. These glaciers as well as glacial lakes are the sources of the headwaters of two main rivers in the region, the Teesta and the Rangeet.

The glaciers and glacial lakes in Sikkim Himalaya are nature's renewable storehouses of fresh water that benefit hundreds of millions of people downstream. Lakes at elevations higher than 4,000 m are considered as glacial lakes. Most of these lakes are located in the down valleys close to the glaciers. They are formed by the accumulation of vast amounts of water from the melting of snow and ice cover and by blockage of end moraines. The sudden break of a moraine dam may generate the discharge of large volumes of water and debris causing disastrous floods downstream.

The glaciers are concentrated in the northwest and northeast extremes of the state. The perpetual snow line is found above 5,300 m. A number of glaciers descend from the northeastern slopes of Mt. Khangchendzonga into the Sikkim Himalaya in North and West Sikkim. The glaciers in the northwest section are mostly valley glaciers and have long dimensions, whereas the glaciers in the northeastern section are small and isolated in the form of mountain glaciers. The longest one is Zemu glacier, which covers 133 sq km which accounts for more than 30% of the glaciers of the state and extends down to 4,000 m from Mt. Khangchendzonga. On the basis of satellite images of 1987 to 1989, Kulkarni and Narain (1990)

reported that the glacier, cover an area of about 426 sq km in the Sikkim Himalaya.

In all, 271 glaciers could be delineated in the present study covering an area of 518.97 sq km with an approximate ice reserve of more than 60 km<sup>3</sup> (Fig.10 and 10A). Generally, six types of glacier were observed in the Sikkim Himalaya— mountain glaciers, valley glaciers, cirque glaciers, niche glaciers, ice caps, and ice aprons.

There are altogether 313 glacial lakes throughout the Teesta basin of the Sikkim Himalaya covering an area of 21.5 sq km (Fig. 9 and 10).

The number of glacial lakes in the Sikkim Himalaya as reported by ICI-MOD in 266 covering an area of 20.2 sq km. The largest number (153) of glacial lakes are erosion lakes. There are 43 moraine-dammed lakes; among which one is a lateral moraine dammed lake. There are 33 valley lakes, 19 cirque lakes, 15 blocked lakes and 3 supra-glacial lakes. There are other supra-glacial lakes in the moraine of the glaciers, which are mostly frozen and some of it are quite small in size to map. In general, the erosion lakes are isolated and far away from the glaciers, moraine dammed lakes are close and associated with the present glaciers, valley trough lakes are situated along the river valley floor and some of it are quite close to the glacier end, blocked lakes are formed due to landslide, ice avalanche etc. from different valleys, and the supraglacial lakes are situated in groups within the ice mass.

Periodic or occasional release of large amounts of stored water in a catastrophic outburst flood is widely referred to as a Glacial Lake Outburst Flood (GLOF) in the Himalaya. GLOF is a catastrophic discharge of water under pressure from a glacier. GLOF events are severe geomorphological hazards and their floodwaters can wreak havoc on all human structures located on their path. Much of the damage created during GLOF events is associated with the large amounts of debris that accompany the floodwaters.

### **Potentially dangerous lakes**

A moraine-dammed lake, which has breached and closed subsequently in the past and has refilled again with water, can breach again. Lhonak Chho in the north-west of Sikkim burst out. The study of recent aerial photographs and satellite images shows a very quick regaining of lake wa-



ter volume. At present, it is refilled again with water and poses danger. Regular monitoring of such lakes is necessary using multi-temporal satellite images.

Although there are no reports on the GLOF events in the Sikkim Himalaya, many debris flow along the glacial lake valley are seen in the satellite images. The erosion and deposition of debris along the valley can be seen clearly from the satellite images.

## Hydro-power potential of Teesta River

WATERSHED CODE, AREA, VOLUME, LOCATION OF  
CATCHMENT AREA OF TEESTA STAGE -V

### Dzongu Catchment

There are nine sub-watersheds spread in the upper catchment in north district i.e. three sub-watersheds in Dzongu viz. T10 the main drainage at the vicinity of the dam site covering Rongdol, Phedang, Gorsangtok; T11 covering part of Ring Khola or Manchu Drainage covering entire villages of Samdong, Tarang, Goan, Sudur; T12 Lingdok, Barfok, Manzing, Bringbong, part of Sudur Drainage.

### Dzongu Catchment *contd.*

Watershed code	Type of land	Area	Volume	Location
3TA1B3-T10	Non Agri. Agri. land Part Agri.	752 ha. 100 ha	1400 cum.  3000 cum.	Phedang, Rongdul, Gorsangtok, part of Lum
3A1B3T-11	Non Agri. Agri. land Part Agri.	711 ha 174 ha.	500 cum 5000 com 1375 cum	Part of Menchu, Ringkhola, Samdong, Tarangoan, Sudur, Hee-gyathang
3A1B3T-12	Non Agri. Agri. land Part Agri.	775 ha 225 ha	1300 cum 2000 cum 3500 cum	Lungdung Barfok, Manzing, Bring bong, Sudur, Part of Heeg-yathang

### Mangan Catchment

Watershed code	Type of land	Area	Volume	Location
3A1B2-T1	Non Agri. Agri. land Part Agri.	1330 ha	1000 cum 8000 cum 175 cum	The main drainage of Rangrang nalla, Kalay RF Chandy, Ringchim, Armbithang, Thingchim Mangshilla, Ralak.

3A1B3-T2	Non Agri. Agri. land Part Agri.	520 ha. 100 ha.	1000 cum	Namok, Tanek Dikchu, part of Mangshilla Swyam.
3A1B3-T3	Non Agri. Agri. land Part Agri.	1005 ha. 375 ha.	2000 cum	Labrang, Phodong, Chewing, Phamtam, Menrongong, Phensang.

### Phodong Catchment

Watershed code	Type of land	Area	Volume	Location
3A1B3-T4	Non Agri. Agri. land Part Agri.	179 ha. 175 ha.	2000 cum 800 cum	Ramthang, part of SangaTanek, Phodong
3A1B3-T5	Non Agri. Agri. land Part Agri.	50 ha. 1125 ha.	1000 cum 600 cum	Bakcha chu to main drainage, Labi, part Phensang, Kabi, Gaikhana, Nakchok, Tsonaknam, Panch Pokhori.
3A1B3-T6	Non Agri. Agri. land Part Agri.	709 ha. 175 ha.	1250 cum 800 cum	The main drainage is the northern flank of Rateychu which separated at BII the state boundary between North and east district. The upper area covers Tamze Valley, Kabi Lungchok, Barfungchen BII.

### Gangtok/ Ratey Chu Catchment

Watershed code	Type of land	Area	Volume	Location
3A1A3-T7A	Non Agri. Agri. land Part Agri.	640 ha.	1000 cum 2000 cum	Ratey chu eastern flank, part of Tamze valley.
3A1A3-T7B	Non Agri. Agri. land Part Agri.	500 ha. 125 ha.	2500 cum 220 Rmt 1000 cum	Rakchu, Pithanghiha.
3A1A3-T7B	Non Agri. Agri. land Part Agri.	500 ha. 125 ha.	2500 cum 220 Rmt 1000 cum	Rakchu, Pithanghiha.
3A1A3-T7C	Non Agri. Agri. land Part Agri.	150 ha. 75 ha.	300 cum 2000 cum	Phengla, Navey Shotak, Tashi View Point.
3A1A3-T8	Non Agri. Agri. land Part Agri.	400 ha. 50 ha.	2500 cum 1000 cum	Lingdok, Nampong, Rakshey Khola

3A1A3-T9	Non Agri. Agri. land Part Agri.	220 ha. 100 ha.	1000 cum 2000 cum	Rakdong Tintek, 4 <sup>th</sup> Mile, Dikchu.
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The river Teesta has great potential for development of power, as the river descends from an elevation of about 5,280 m to about 213 m over a distance of about 175 km. According to the preliminary reconnaissance survey by the team of experts of erstwhile Central Water & Power Commission in 1974, the river could be harnessed under a cascade development for hydro-power generation. The hydro-electric potential of the Teesta and its tributaries in Sikkim was estimated at about 3735 MW (Table 4 & 5, Fig. 11). The cascade development consists of power generation in six stages along Teesta river. In addition, Sikkim Power Development Corporation had identified more schemes to be developed with help of private agencies.

**Table-4: Hydro-electric potential of the Teesta and its tributaries**

Sl. No	Teesta HEP Stage	Area/Location	Installed/ Capacity/ MW	Remarks
1	Stage I	Zemu Lakes	320	Under study
2	Stage II	Lachen/Lachung/ Chungthang	750	Survey under way
3	Stage III	Chungthang	1200.	Environment clearance accorded for operation by Teesta Urja Ltd
4	Stage IV	Singhik/Swayam	495	EIA, EMP under study by NHPC
5	Stage V	Dikchu/Shirwani	510	Nearing completion
6	Stage VI	Shirwani/Rangpo	500	Environment clearance accorded for operation by LANCO

**Table 5: Estimated Hydro-power Potential in Sikkim State**

S.No.	Name of Project	Installed Capacity (MW)
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<b>A.</b>		
1.	Teesta Hydel Project Stage-I	320
2.	Teesta Hydel Project Stage-II	330 ?
3.	Teesta Hydel Project Stage-III	1200
4.	Teesta Hydel Project Stage-IV	495 ?
5.	Teesta Hydel Project Stage-V**	510
6.	Teesta Hydel Project Stage-VI	440
<b>B*.</b>		
7.	Rolep H.E. Project**	32
8.	Ralang H.E. Project	40
9.	Chakung Chhu H.E. Project	50
10.	Chuzachen H.E. Project	99
11.	Sada Mangder H.E. Project	71
12.	Bhasme H.E. Project	32
13.	Rangeet Stage-II H.E. Project	60
14.	Rangeet Stage-IV H.E. Project	90
15.	Jorethang Loop HEP	96
<b>Total B</b>		<b>570</b>
<b>C. Pre-feasibility Studies</b>		
1.	Jedang H.E. Scheme†	185
2.	Talem H.E. Scheme†	75
3.	Rongni H.E. Project	95
4.	Ringpi H.E. Scheme	160
5.	Dik Chhu H.E. Power Project	90
6.	Lachen H.E. Scheme	210
7.	Lingza H.E. Scheme	160
8.	Rangyong H.E. Scheme	90
9.	Talem H.E. Project	75
10.	Rukel H.E. Scheme	90
11.	Panan H.E. Scheme	200
<b>Total C</b>		<b>1430</b>
<b>Total A + B + C</b>		<b>5295</b>

A = Schemes identified by Central Water Commission

B = Schemes being promoted by private agencies

C = Schemes identified under Hon'ble Prime Minister's 50,000 MW initiative

\* The list is incomplete

\*\* Under construction

† These schemes are modified version of original Teesta Stage-I and Stage-II schemes

## Teesta Stage V

The Teesta Stage V is the second Hydro-electric Power Project entrusted to NHPC, the first being the Rangeet Hydro-electric Power Project located in West District commissioned in the year 2000-2001. The salient features TS-V are as under:

### LOCATION

State	Sikkim
River	Teesta
Dam Site	2 km downstream of the confluence of Dikchu and Teesta river near village Dickchu
Longitude	88°27'30'' E
Latitude	27°15'00'' N
Access to the project from	Distance from dam site -140 km
Bagdogra Airport	Power house site-110 km
Railhead	New Jalpaiguri & Siliguri

### HYDROLOGY

Catchment Area	4307 sq. km
Free draining area	2020 sq. km
Design discharge	9500 Cumecs (PMF)

### RESERVOIR

Full Reservoir Level (FRL)	EL 579.00m
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Max. Reservoir Level (MWL)	EL 580.72 m	
Min. Draw Down Level	EL 568.00 m	
Gross Storage up to FRL	13.25 MCM	
<b>DAM</b>		
Type	Concrete Gravity Dam	
Height of dam from deepest		
Foundation level	96.45 m	
Elevation of top of dam	EL 583.20 m	
Length of dam at top	182.50 m	
<b>SPILLWAY</b>		
Design Flood	9500 Cums (PMF)	
Type	Central Ogee Shape	
Crest Level	EL 551.00 m	
Maximum Head over crest		
(w. r. t. FRL)	28.0 m	
Type of Gate	Radial-Sluice	
Number & Size	5 nos. (11 m wide x 16 m high)	
Energy dissipation	Trajectory bucket	
Top of road	EL 583.2 m	
<b>DIVERSION TUNNELS</b>		
Number	2	
Shape & Size	Horse Shoe 12.2 m dia	
Lengths	600m & 460 m (approx)	
Diversion flood	3251 cumec	
<b>COFFER DAM</b>		
Length	U/S C.Dam	131 m
	D/S C.Dam	78 m
Height	U/S C.Dam	25 m
	D/S C. Dam	10 m
<b>INTAKE</b>		

Invert Level	EL 556.50 m
Number & Size	3 nos., 6.5 m dia
Design discharge	117 cumec each

#### **DESILTING CHAMBER**

Type	Dufour type
Length	315 m
Number of Chamber	3 nos.
Design discharge	117 Cumec each chamber
Particle size to be removed	0.2 mm and above (90%)
Size of Chamber	20 m (width) x 22.5 m (height)

#### **HEAD RACE TUNNEL**

Number	One
Shape	Horse Shoe
Size	9.5 m dia
Length	17.78 km
No. of Adits	5
Design Discharge	292.37 cumec

#### **SURGE SHAFT**

Type	Semi-underground
Diameter	25.0 m
Height	92.0 m
Maximum Surge Level	EL 615.0 m
Minimum Surge Level	EL 544.0 m

#### **PENSTOCK/PRESSURE SHAFT**

Type	Vertical Pressure Shaft
Number	Three, Steel lined
Design Discharge through each	97.45 cumec
Diameter	4.7 m dia each
Depth	Approx. 175 m

#### **POWER HOUSE**

Type	Underground
Type of Turbine	Francis
Design Discharge (cumecs)	3 units 292.37 cumec
Size of Machine hall	100.5 m x 22m x 49 m
No. & capacity of Units Service	3 nos. of 170 MW each
Bay Level	EL 367.30 m
Generator floor Elevation	EL 362.30 m
Bottom of Draft Tube	EL 342.20 m
Centre Line of turbine	EL 354.70 m
Minimum Tail Water Level	EL 359.50 m
Maximum Tail Water Level	EL 360.00 m
Maximum Flood Level (for Q=9500 cumec)	EL 370.75 m
Gross Head	216.73 m
Net head	197.57m
TAIL RACE TUNNEL(Concrete lined)	
Type	D-shaped
Length	135 m
Width	6 m
POWER GENERATION FIGURES	
Installed capacity	510 MW
Dry season peaking capacity	510 MW
Annual energy production in a 90% dependable year	2573 GWH

## Geological interpretation of Sikkim

### Fragile geology

Whole of the Sikkim Himalaya has very sensitive geological formations with many intermittent faults/thrusts, lineament, unconformity; major structures like-MBF and MCT make the entire region seismically active and tectonically unstable. *The area south of MCT is highly vulnerable to*



earthquakes. The presence of ductile deformation zones indicates tectonic movement. The tectonical history and metamorphic zonations also indicate several tectonical movements in the region.

*Sikkim region lies within the ambit of the Seismic Zone-IV of I.S. code 1893-1984/1998/2000. With reference to the MSK intensity scale used for all engineering design purposes, the region lies in the high damages risk zone (VIII) corresponding to a magnitude of 6.7 in the Richter scale. Therefore, there is always a necessity to consider the factor of safety for highest earthquake intensity, while designing an engineering construction.*

*The 50 km wide zone between the Main Boundary Thrust (MBT) and the Main Central Thrust (MCT) is seismically most active. This zone is also known as the Main Himalayan Seismic Belt in which the massive earthquakes ( $M > 8$ ) have been occurring along the detachment surface that separates under-thrusting Indian plate from the Lesser Himalaya. Focal mechanism results suggest that the mosaic of active lineaments, forming conjugate shear planes, dominates the neo-tectonic deformation in the Nepal-Sikkim Himalaya and their foredeep (Dasgupta *et al.* 1987). The tectonoclimatic evidences also indicate tectonic movement during the deposition of the Quaternary alluvial sediment.*

The project area is subjected to massive excavation (road building, shaft construction), vibrations (dynamite blasts, heavy vehicular movement), (earthquakes) and other form of stress on geology which has major impact on the stability of the area.

### **Unfavourable geomorphologic characteristics of Teesta Basin**

The high rainfall (about 2,300 mm) over the steeper slopes has created a suitable environment for initiation of run-off and subsequent soil-erosion, slope failures, slides or sinking of land masses. Upper Teesta basin is also characterized by huge accumulation of debris in form of debris cones, rock-glaciers and alluvial fans, debris avalanches and other hazards. This debris is transported mainly in monsoon season and during snow-melt period. Transportation rates of this debris become 20 times more than normal during any catastrophic event.

Upper Teesta basin contributes huge amounts of silt. The movement of glaciers over their beds, reduce the rock surface to rock floor by their frictional activity which after mixing with melt-water forms the thin mud

during peak melt discharge. The changes in glacial-phase of the Upper Teesta basin section require special attention in planning for watershed management, especially landslide and flood-control in lower reaches.

According to one well-established estimate, nature takes nearly 1000 years to produce a few centimetre of top soil, but destabilizing forces of nature in the mountainous areas wipe away millions of cubic metres in just one second! The rate of erosion in the catchment area of the Himalayan rivers has increased five-fold in the geological time scale; the present rate being upwards of 1 mm per year. According to Valdiya, rivers are carrying incredibly large amount of sediment at the rate of 16.5 hectare metre per hundred sq. km of the catchment area per year, leading to rapid siltation of reservoirs and lakes. Satellite photographs taken in 1974 dramatically reveal that eroded debris carried by the Himalayan rivers have created a new landmass over 50,000 sq. km in area, extending about 700 km into the Bay of Bengal.

Construction of roads requires imaginative planning and methodical construction, but when engineers work against time, they may not even have the basic data on geological formation, topography, drainage pattern etc. and as a result. Let us not forget that every kilometre of road when constructed may bring about a stress relief equivalent to about 1-2 lakh tonne of rock mass and if the road cuttings are not properly protected, landslides and rock falls become imminent adding about 1,000 tonne of land loss per km. annually. At many major landslide locations, the debris clearance may well be of the order of 4,000-5,000 tonne annually. In North Sikkim and Garhwal it clearly reveals that on an average there are 2 landslides every sq.km. (R.K. Bhandari, *The Indian Landslide Scenario, Strategic Issues and Action Points*, 2006). And if a weightage average of one more every 6 sq.km is added to the mean rate, land-loss is to the tune of 120 m<sup>3</sup> per km<sup>2</sup> per year and annual loss of land is about 2,500 tonne for every sq. km of area. (Bhandari et al. 1985).

### **Drastic hydro-meteorological incidence in the Teesta River Basin**

Rainfall, particularly in the Sikkim Himalaya, is generally punctuated by flashes of cloudburst. A cloudburst comes with the speed of thunder, lasts for a few minutes to as long as three hours at a stretch, and usually leaves behind a trail of devastation worse than inflicted by the combined effect

of entire rainfall in the same area, for the rest of the season. Rainfall record of the Teesta Valley for the period 1891-1965 speaks of rainfall intensities exceeding 250 mm in 24 hours, repeated more than 40 times! Taking the mean annual precipitation as 5000 mm for the Teesta Valley, the Event Co-efficients ( $C_e$  = precipitation record of the event/mean annual precipitation) do range between 0.06 and 0.36 which are remarkably high values from any standard, and are usually associated with landslides' on the lower side of the scale and landslide disasters on the higher side of the scale.

The analytical facts show that 'cloudbursts' of intensities exceeding 1000 mm in 24 hours ( $C_e > 0.2$ ) trigger mass movements practically in any circumstances, and for  $0.1 < C_e < 0.2$ , probability of mass-movement is pretty high. For  $C_e < 0.1$ , biunivocal (unequivocal) relationship between rain and slides does not seem to exist.

### High seismicity of the Teesta Basin

Sikkim region lies within the ambit of the Seismic Zone-IV of I.S. code 1893-1984/1998/2000. With reference to the MSK intensity scale used for all engineering design purposes. The region lies in the high damages risk zone (VIII) corresponding to a magnitude of 6.7 in the Richter scale. The MCT (Main Central Thrust) passes about 5 kms east of Gangtok and crosses the Teesta River near Manul. The E-W trending north dipping MBT (Main Boundary Thrust) crosses the Teesta River near Kalijhora Township. The spatial distribution of seismic activity in the region during the period 1964-1992 suggests that the regional seismicity of Sikkim Himalaya is relatively high to the north of the Main Boundary Thrust (MBT) and the activity decreases progressively southward from the Lesser Himalaya to the foredeep region. Temporal variation of seismicity in the area shows that there is burst of earthquake for a year or two preceded by a quiet period of 3 to 4 years.

Landslide is closely related to the earthquake occurrence, this relationship is more important for younger mountains. Unless earthquake-induced landslides are mapped, landslide hazard zonation maps will remain incomplete on the unsafe side. Naturally, any attempt to do hazard and risk assessment without the knowledge of earthquake induced landslides will be open to question.

### **High landslide in the Basin area**

In North Sikkim, the right bank sections of Teesta valley at the Bop Nala and towards its south are landslide-prone. The sediments are carried away and showered on the road leading to impediment of traffic movement as well as loss of human life and property, including domestic animals. Heavy precipitation and glacial melt at times result flood in the river channel. These heavily sediment-laden flood waters destroy forest, aggrades river channel and changes the course of the channel. Such flows also erode the valley sides and result in the creep of the landforms, thereby affecting the settlements on it. In Sikkim, the confine of a cluster of epicenters in several regions and parallelism of the courses of major rivers and their tributaries and the seismogenic nature of MBT do not rule out any future large magnitude tremor. The thick moraine deposits at several sites in North Sikkim provide weak substrates on which it seems very unsafe to establish any mega developmental project.







**Public Hearing Conducted By State Pollution Control Board-Sikkim, And The Status Of Environmental Clearance Of The Proposed Hydro-Electric Projects (1997-2010)**

Sl. No.	Name of the Hydro-electric project	Name of the Developer	Generation Capacity (MW)	Documents submitted	Public hearing conducted on	Status of Environmental Clearance
1.	Teesta hydro electric project. Stage-V, East.	National Hydro-electric Power Corporation (NHPC)	510 MW	DPR, Executive Summary, EIA & EMP	02/12/1997	Environmental clearance granted by MoEF vide letter no. J-12011/1/98-1A-1 dated: 19/05/1999
2.	Rolep Hydro electric project East.	Amalgamated Trans Power India Ltd (ATPIL)	36 MW	DPR, Executive Summary, EIA & EMP	22/07/2003	Environmental clearance granted by MoEF vide letter no. J-12011/12/2003 IA-1, dated: 25/02/2004
3.	Chujachen Hydro electric project. East.	GATI Infrastructure Ltd.	99 MW	DPR, Executive Summary, EIA & EMP	30/09/2004	Environmental clearance granted by MoEF vide letter no. J-12011/12/2003 IA-1, dated: 09/09/2005
4.	Sada-Mangder Hydro electric project. East.	GATI Infrastructure Ltd.	71 MW	DPR, Executive Summary, EIA & EMP	16/10/2004	Environmental clearance granted by MoEF vide letter no. J-12011/26/2007 IA-1, dated: 25/02/2004
5.	Jorethang Hydro electric project. South.	DANS Energy Pvt. Ltd.	96 MW	DPR, Executive Summary, EIA & EMP	09/04/2008	Environmental clearance granted by MoEF vide letter no. J-12011/19-/2006 IA-1, dated: 26/07/2006
6.	Teesta Hydro electric project. Stage-III, Chungthang, North.	Teesta Urja Pvt. Ltd.	1200 MW	DPR, Executive Summary, EIA & EMP	08/06/2006	Environmental clearance granted by MoEF vide letter no. J-12011/26/2006 IA-1, dated: 04/08/2006
7.	Teesta Hydro electric project. Stage-VI, Manning, East.	LANCO Energy Pvt. Ltd.	500 MW	DPR, Executive Summary, EIA & EMP	21/06/2006	Environmental clearance granted by MoEF vide letter no. J-12011/55/2006 IA-1, dated: 21/09/2006
8.	PANAN Hydro electric project. North.	HIMAGIRI Hydro energy Pvt. Ltd.	300 MW	DPR, Executive Summary, EIA & EMP	18/09/2006	Environmental clearance granted by MoEF vide letter no. J-12011/58/2006 IA-1, dated: 02/01/2007



9.	Rongni chu Hydro electric project. East	Madhya Bharat Power Corporation Ltd.	96 MW	DPR, Executive Summary, EIA & EMP	28/10/2006	Environmental clearance granted by MoEF vide letter no. J- 12011/56/2006 IA-1, dated: 04/04/2007
10.	Rangit Hydro electric project. Stage-IV, Reshi, West.	JAL Power Corporation Ltd.	120 MW	DPR, Executive Summary, EIA & EMP	15/12/2006	Environmental clearance granted by MoEF vide letter no. J- 12011/11/2007 IA-1, dated: 16/05/2007
11.	Bhasmey Hydro electric project. East	GATI Infrastructure Ltd.	51 MW	DPR, Executive Summary, EIA & EMP	15/03/2007	Environmental clearance granted by MoEF vide letter no. J- 12011/04/2006 IA-1, dated: 15/05/2007
12.	Rammam Hydro electric project. West.	National Thermal Power corporation Hydro Ltd. (NHL)	120 MW	DPR, Executive Summary, EIA & EMP	04/05/2007	Environmental clearance granted by MoEF vide letter no. J- 12011/42/2007 IA-1, dated: 17/08/2007
13.	Dikchu Hydro electric project. North & East.	SNEHA Kinetic Power Project Ltd.	96 MW	DPR, Executive Summary, EIA & EMP	18/11/07 & 19/11/2007	Environmental clearance granted by MoEF vide letter no. J- 12011/91/2007 IA-1, dated: 01/04/2008
14.	Rangit Hydro electric project. Stage-II, West.	Sikkim Hydro Power Ventures Ltd.	66 MW	DPR, Executive Summary, EIA & EMP	21/09/2008	Environmental Clearance awaited by MoEF.
15.	Teshiding Hydro electric project. West.	Shiga Energy Pvt. Ltd	97 MW	EIA, EMP & Executive Summary	18/06/2009	Environmental Clearance awaited by MoEF.
16.	Ting Ting Hydro electric project. West.	T.T. Energy Pvt. Ltd	99 MW	EIA, EMP & Executive Summary	15/09/2010	Environmental Clearance awaited by MoEF.
17.	Lethang Hydro electric project.	KHC Lethang Hydro Project Private Limited	96 MW	EIA, EMP & Executive Summary	16/09/2010	Environmental Clearance awaited by MoEF.

## HISTORY OF LANDSLIDES IN SIKKIM

Slide Name	Type Material	Magnitude Intensity	Danger area	Triggers	Warning	Strike time	Damage done
Bojoghari	Debris flow	Small Fast	Settlements Road	Thunder-storm	No	26/6/07	House 2-killed
Amdo Golai	Rockfall	Small Fast	Settlements Road	Bad geol. Steep slope + water Vibration	No	03/6/07 13/6/07 16/6/07 26/6/07	6-RCC buildings vacated
20th Mile Burdang	Complex Debris	Large Fast	NH31A	Heavy rain Steep slope Bad geol. Vibration	Rockfalls	16/7/07	Road block
Tinzir (Namchi)	Mudslide	Medium Fast	Villages Roads	Heavy rain Bad geol. Steep slope	NA	17/7/07	House 2-sisters injured
Namchi	All types	Mostly small	Roads	Heavy rain Bad geol.	NA	17/7/07	Namchi cutoff
Legship Kalej Khola Hing-dam	All type	Small to large	Villages Roads	Heavy rain Unstable slope	Rockfalls Subsidence	17/7/07	Roads
Ralong Ra-bongla	All type	Minor to major	Villages Roads	Heavy rain Bad geol. Steep slope	NA	18/7/07	27-Houses

Tikjeck (Gy- alshing)	Avalanche Debris	Medium Fast	Gurasaydara to Tikjeck	Heavy rain Steep slope Bad geol.	NA	03/8/07 8PM	16-Houses vacated
Pelling-Den- tam	All types	Mostly small	Villages Road	Heavy rain Steep slope Bad geol.	NA	26 to 29/8/07	Road
Legship	Debris fall	Medium Fast	Road	Heavy rain Steep slope Bad geol.	NA	26 to 29/8/07	Road
Namchi	Debris flow	Large Fast	Settlements Roads	Heavy rain Steep slope Thick over- burden	NA	30/8/07	One house washed away
Hathisurey	Rock fall	Small Fast	Road NH31A	Heavy rain Steep slope Bad Geol. Vibration	Jointed siwalik -sandstone	26 to 06/9/07	Road block
Kalej Khola Nag Dara	Avalanche Rock/Debris	Medium Fast	Road	Heavy rain Steep slope Bad geol.	NA	05/9/07	Road

State	Electrical Energy Requirement (GWh)			Peak Electric Load (MW)		
	2011 - 2012	2016 - 2017	2021-2022	2011 - 2012	2016 - 2017	2021-2022
Delhi	36292.545	52762.386	73481.328	6092.409	8728.832	12069.050
Haryana	38417.069	54304.879	73838.162	6839.158	9375.160	12557.464
Himachal Pradesh	9503.908	13135.520	17657.400	1611.109	2194.159	2906.958
Jammu & Kashmir	11202.446	15271.949	21282.743	2062.737	2789.568	3856.642
Punjab	60488.861	82571.657	107342.309	11000.469	14441.277	18351.770
Rajasthan	48915.759	67767.236	92376.811	8482.079	11404.490	15100.779
Uttar Pradesh	79267.680	110664.947	150157.415	13947.013	19622.530	26833.528
Uttaranchal	8444.717	11667.894	16191.306	1533.337	2085.410	2849.272
Chandigarh	2308.347	3366.693	4440.158	419.542	602.307	782.095
<b>Sub Total (NR)</b>	<b>294841.333</b>	<b>411513.161</b>	<b>556767.632</b>	<b>48136.901</b>	<b>66582.928</b>	<b>89912.790</b>
Goa	4582.911	6879.880	9082.496	721.306	1082.827	1429.498
Gujarat	85445.226	119083.096	156841.512	14373.742	19670.034	25446.677
Chhattisgarh	21784.878	33076.392	45115.620	3565.388	5374.867	7279.413
Madhya Pradesh	49338.498	70444.570	98986.680	8461.912	11772.241	16128.817
Maharashtra	125661.409	167226.739	219910.417	21953.740	28347.752	35944.127
D. & N. Haveli	5041.957	8204.128	12242.813	777.792	1265.600	1888.623
Daman & Diu	3004.817	4890.242	7842.185	552.088	857.119	1323.701
<b>Sub Total (WR)</b>	<b>294859.697</b>	<b>409805.046</b>	<b>550021.724</b>	<b>47108.381</b>	<b>64348.650</b>	<b>84778.064</b>
Andhra Pradesh	89032.490	132118.210	175590.124	14721.210	21845.290	28215.843
Karnataka	53539.620	79995.770	107470.552	8826.000	13092.380	17463.812
Kerala	19229.540	26331.640	36134.030	3528.050	4573.790	5916.364
Tamil Nadu	87221.910	134754.730	182825.156	14224.060	21975.660	29814.931
Pondicherry	4419.430	6867.800	9639.046	682.500	1060.600	1488.566
<b>Sub Total (SR)</b>	<b>253442.990</b>	<b>380068.150</b>	<b>511658.908</b>	<b>40367.135</b>	<b>60432.580</b>	<b>80484.967</b>

Bihar	19904.770	32857.080	58248.405	3607.000	5598.220	9567.426
Jharkhand	23408.480	36274.000	51741.061	4296.130	6604.000	9129.079
Orissa	27149.150	39095.650	63098.108	4459.000	6330.460	10074.098
West Bengal	41019.893	60228.010	84498.993	7406.850	10742.720	15071.881
Sikkim	320.000	486.930	629.382	83.000	119.540	150.465
<b>Sub Total (ER)</b>	111802.293	168941.670	258215.949	19088.442	28400.908	42711.602
Assam	7584.620	13052.660	24433.491	1443.000	2292.350	3984.588
Manipur	931.890	1359.680	2336.809	203.000	269.940	444.598
Meghalaya	2101.000	2777.700	4015.131	428.290	542.030	751.391
Nagaland	698.000	1040.070	1505.358	152.000	222.340	318.821
Tripura	1229.000	1761.080	3180.264	282.000	386.610	666.135
Arunachal Pradesh	385.520	557.380	762.307	116.000	147.970	189.177
Mizoram	398.481	594.690	763.662	115.249	161.750	196.033
<b>Sub Total (NER)</b>	13328.511	21143.260	36997.022	2536.610	3759.804	6179.947
Andaman & Nicobar	343.590	536.570	779.450	76.910	118.940	131.660
Lakshadweep	40.130	58.190	67.548	11.450	16.610	19.277
<b>Total (All India)</b>	968658.543	1392066.048	1914508.233	152746.097	218208.593	298253.241

## Letters From the People of Lachen to the Authorities Concerned

To  
His Excellency Bimalakrishna Prasad Singh  
The Governor of Sikkim,  
Camp: Lachen, North Sikkim

Your Excellency

At the outset we, the residents of Lachen village and its neighbourhood, extend to you our cordial greetings and warm greetings for making it convenient to visit this remote region of the State of Sikkim, which has the classified indigenous population of the tribal of Sikkimese origin and who have been living here for ages braving the inhospitable climatic conditions of nature and lead almost a nomadic pattern of life. The weather conditions necessitate movements round the year. Being the men of the soil, we have to survive on the land of our forefathers land of our forefathers.

Your Excellency, in the democratic process we have, during the past fifteen years supported the ruling Government of the Sikkim Democratic Front Party with the pious hope of having our aspirations fulfilled and interests safeguarded. Despite our genuine and innocent considerations, the Government has failed in and has acted most irresponsibly in protecting our bonafide rights which have been trampled with impunity and least regard to the provisions of protection that existed right from the erstwhile rule of Moewing Chogyal Chenspa Lachen/Lachung and the entire Dzongpa region fall under the protected area and the proof of this is that right from Chenspa's time we have enjoyed a special status inasmuch as our land still remains unfragmented with Land Revenue Department, Government of Sikkim. Lacking advantage of our simplicity and normal way of living, the Government has been encroaching upon our claims and bonafides and is making it more and more pattern of existence that is going to make us landless and threat to our survival.

During examples of how the Sikkim Democratic Front Government has adopted oppressive measures to slow down the innocent Lachenians are not far to seek. Some examples are submitted below but these are only pointers:-

- a) Devastating earthquake caused by the melting of Zaskar Glacier in 2000 affected major livestock loss to the Lachenians and but backward wealth continue suffer minor of livelihood. But the State Government never even bothered to provide relief to the victims.
- b) Floods and mud flow between Thanga and Lachen in 2009 caused significant livestock loss but again the State Government never did them.
- c) National Programmes like distribution of APL rice, Antyodaya Anna Yojana for BPL families, Antyodaya Yojana for poor season labour etc. are not at all implemented properly in Lachen.
- d) Schemes under NREDA Act, 2005 have not at all been implemented till date for the current financial year thereby depriving the APL Card holders of Lachen of minimum 100 days employment in 2009.
- e) The Central Government has approved and sanctioned programme for distribution of Scheme 1 interest on Lachen but the distribution has been kept in abeyance. There is apprehension that the efforts are on to divert this scheme elsewhere.
- f) The State Government has not spared Lachen and Lachenians even in providing Central Aid for the preservation of our culture and tradition. While it advances Central Aid to other communities lavishly, it had sanctioned only Rs. 50,000/- for

To:

**Her Excellency The President of India**

Rashtrapati Bhawan

New Delhi-110 004.

Your Excellency,

We the *simple*, humble and oppressed people of Lachen, North Sikkim are utterly confused whether we are Indian nationals of Sikkimese origin or whether there has been a gross error in demarcating the Indo-Tibet border in the northern region of Sikkim whereby Lachen has been included in the erstwhile Kingdom of Sikkim, which is now an integral part of the Union of India.

Such confusion has resulted from the way we are treated by the present State Government of Sikkim. We are treated as alien citizens, who are not eligible to any developmental benefits funded by the Government of India. Such indifferent and discriminations treatment is directly contributing towards economic dilapidation of the people of Lachen leading to rapid erosion of their cultural heritage.

The culprits of such ill treatment meted out to us have made the situation murky and we are made to think that we are not Indian citizens and as such we have no part to play here. We are also human beings needing bare minimum for our survival but the inhuman and indifferent attitude shown towards us by the present State Government, its Ministers, MLAs and officials has driven us to the extreme frustration whereby we have to question ourselves whether we are Chinese/Tibetans whose land has been erroneously included in the Indian territory.

Our tolerance has reached the stage of utter exhaustion as we cannot see ourselves, our children suffering from the agony of economic deprivation unleashed on us by the autocratic and least sensitive State Government.

Your Excellency, under the circumstances as elaborated above, we the suppressed and oppressed people of Lachen, North Sikkim are left with no

other alternative but to pray to your Excellency to kindly order for establishing our citizenship so as to relieve us of the extreme anxiety and frustration we are passing through.

If we do not belong to India, the country which we have so endeared as our own motherland and strived to participate in its overall development and even ready to lay down our lives in defending it, we may be issued permits or deported back to Tibet/China so that we can find a new pasture for our survival.

In the event our citizenship as Tibetan or Chinese is established we will vacate our ancestral landed properties in Lachen to facilitate total occupation of the same by the Indian Army, implementation of hydroelectric power projects or any other developmental projects which the National Government or the State Government of Sikkim may be so eager to carry out in the resultant vacation of the vast stretch of land belonging to the people of Lachen as allotted to their forefathers by the then Chogyal or King of Sikkim many hundred years ago.

Your Excellency, in the event of authentication of our citizenship as Indians, which we actually are, we should be entitled to reap the fruits of development as any other citizen of this country and the State Government should forthwith stop treating us as second class citizens and allow us to live as human beings, in the land of our origin.

With our highest respect.

Yours oppressed and suppressed people of Lachen,

1. Cho Rabjor Lachenpa  
Pipon-1, Lachen Dzumsa

2. Ghokey Lachenpa  
Pipon-4L, Lachen Dzumsa

3. Nathang Lama  
Chutimpo of Lachen Monastery.

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## Copy to:

1. The Hon'ble Prime Minister  
152, South Block, New Delhi-110011
2. The Hon'ble Home Minister  
South Block, New Delhi-110011
3. Smt. Sonia Gandhi, NPA Chairperson  
10, Jangpukh, New Delhi-11001
4. His Excellency, The Governor of Sikkim
5. The Hon'ble Chief Minister of Sikkim
6. The Home Secretary, Government of Sikkim

The Central Government has approved and sanctioned programme for distribution of Solar Lamps to Lachen but the distribution has been kept in abeyance. There is apprehension that the efforts are on to divert this scheme elsewhere.

The State Government has not spared Lachen and Lachung even in providing Grant-in-Aid for the preservation of the culture and tradition. While it advances Grant-in-Aid to other communities lavishly, it has sanctioned only Rs.50,000/- for

## SATYAGRAHA FOR THE TEESTA

Protestors from across Sikkim are on hunger strike against projects on the river. **NEERAJ VAGHOLIKAR** reports



*Mountain in a river: Excavated material dumped back in the Teesta to slow its waters*

*Photo: Manju Menon*

**T**he Sikkim government's plans to expedite a major plumbing exercise — involving 26 large hydro-electric projects in the ecologically and culturally sensitive Teesta river basin — is meeting with resistance. Protestors have joined together in an organisation called the Affected Citizens of Teesta (ACT); they have been on satyagraha against these plans since June 20.

The ongoing protests are focused on projects proposed in North Sikkim, particularly in Dzongu, the holy land and exclusive reserve of the Lepcha tribe. The satyagraha has been characterised by a prominent youth presence; another important feature was the support lent by the state's Buddhist monks, who have been offering prayers to protect the satyagrahis and the sacred landscape threatened with desecration.

While Sikkim has seen dam-related protests before, there have never been any on this scale. The 1990s saw the construction of the 60MW Rangeet project, clearances for the 510MW Teesta V project (currently under construction) and the scrapping of the Rathong Chu project following protests about its impact on a sacred landscape. But in the last three years, the state government has signed MOUs for no less than 26 large hydro-electric projects in the state.

On December 12, 2006, ACT met Chief Minister Pawan Chamling. They demanded the scrapping of the projects in Dzongu, and sought a review of other projects in Sikkim. Based on an assurance from the CM that these issues would be looked into, they called off a proposed rally in Gangtok. But ACT's concerns were not addressed and in the months

preceding the satyagraha, the state government started land acquisition procedures for the 1200MW Teesta III and the 280MW Panan projects, both of which involve construction work inside Dzongu. This was the last straw and ACT started its satyagraha on June 20, with 34-year-old Dawa Lepcha and 20-year-old Tenzing Lepcha on an indefinite fast, while others supported them with a relay hunger strike.



*Relay team: Protestors who are on a hunger strike demanding the scrapping of the project  
Courtesy: Weepingsikkim.com*

The arguments used to justify these large projects in Sikkim are: exploitation of the state's perennial water system to produce power for the nation; economic benefits to the state through power export; employment generation and low displacement of local communities. However, several unique features of the state — its ecological and geo-

logical fragility, its indigenous communities, their cultural and spiritual association with the river system and the landscape — pose a challenge to these ambitious plans.

The erstwhile kings of Sikkim had accorded special legal protection to Dzongu and North Sikkim, further reinforced after the merger with India through constitutional protection of old laws and traditions. "The spurt of large hydel projects in Sikkim is in direct contradiction of the constitutional and legal protection given to us. The simultaneous construction of so many projects is going to involve an influx of a huge number of outside labour for a long period of time. These demographic changes are going to have a serious socio-cultural impact, particularly in North Sikkim. We want the seven proposed projects in Dzongu scrapped and others in Sikkim reviewed," says Dawa Lepcha of ACT.

The ministry of Environment & Forests (MOEF), while granting environmental clearance to the 510MW Teesta V project in 1999 asked for a detailed 'carrying capacity' study of the entire Teesta river basin. The clearance letter states: "No other project in Sikkim will be considered for environmental clearance till the carrying capacity study is completed."

Pemzang Tenzing, a civil engineer and ACT member, says: "We were

hopeful that this process would enable a comprehensive assessment of the cumulative impact of the many proposed hydel projects and a serious options assessment for ecologically and culturally sensitive development in Sikkim. But even as the study is being finalised, the MOEF has already granted environmental clearance to at least six hydel projects in Sikkim since 2004 in violation of its own condition.” At least two of these — the 1,200 MW Teesta III and the 280 MW Panan — are on the border of the Khangchendzonga National Park. A large part of the first is, in fact, inside the biosphere reserve and the second involves carrying out ancillary works inside the national park in violation of Supreme Court orders.

Tenzing adds, “Even as per official figures, the projects involve diverting up to 85-90 percent of the river flow in the lean season through long tunnels before the water is dropped downstream. Not only will this destroy the riverine ecology but a cascade of projects will mean the Teesta is in full flow only in brief stretches between the two hydel projects. That is why we are saying that the Teesta is being converted into an underground river.”



*Solidarity: The Lepchas of the Darjeeling hills also support the Sikkim agitators*

*Photo: Azuk Lepcha*

There have been repeated appeals from the state government to withdraw the satyagraha and at least six rounds of talks were held between the government and ACT, but none led to a conclusive breakthrough. After a personal appeal from the CM, Dawa and Tenzing withdrew their indefinite fast on August 21

after 63 days, but the satyagraha continues with the relay hunger strike by other members.

On September 6, the government informed ACT that a seven-member review committee is being set up to “examine various issues related to implementation of hydel projects in Dzongu area of North Sikkim” and that until the submission of a report by the committee within 100 days all activities related to five projects in Dzongu would be stopped with immediate effect. The government has conveniently left out two major projects directly impacting Dzongu – Teesta III & Teesta IV. While it has chosen

to leave out Teesta III where land acquisition procedures have been on, four of the five projects it claims to stop work on are yet to get necessary clearances to start work. On September 10, ACT rejected this proposition and renewed the demand for scrapping all hydel projects in Dzongu.

During this entire period, there has been tremendous support to the satyagrahis from around the country and the world. The Lepchas in the Darjeeling hills have also lent their support to the cause, with a road blockade of NH31A as well as ongoing relay hunger strikes in Kalimpong and Darjeeling. Opposition parties have also taken up the issue, but this has been conveniently used by the ruling Sikkim Democratic Front government to dismiss the entire protest as being "politically motivated". In a speech on Independence Day, the CM made personal attacks on several individuals associated with the protests, including respected Buddhist monk Sonam Paljor Denjongpa. The attack was condemned even by those who support the hydel projects.

Sikkim's Information and Public Relations secretary MG Kiran says: "We do not yet know what their (ACT's) problem is. These are benign projects and we can handle them well." It is ironic that just a few months ago, the state Chief Secretary admitted to an environmental governance crisis in the 510MW Teesta V project in an affidavit to the Supreme Court-appointed Central Empowered Committee. The affidavit says the power company has "grossly violated the terms, conditions and guidelines" of the MOEF and dumped excavated material "into the river Teesta obstructing its free flow causing thereby huge damage to the forest and environment."

*Courtesy: Tehelka*

*Sep 29, 2007*

*[http://www.tehelka.com/story\\_main34.asp?filename=cr290907SATYAGRAHA.asp](http://www.tehelka.com/story_main34.asp?filename=cr290907SATYAGRAHA.asp)*

## TEESTA IV, LAST NAIL IN THE RIVER'S COFFIN?

**Neeraj Vagholikar**

**A**n expert committee of the Central Ministry of Environment & Forests (MoEF) is currently on a visit to Sikkim. The Expert Appraisal Committee (EAC) on River Valley & Hydroelectric projects evaluates applications for environmental clearance of dams in the country and is here related to two hydroelectric projects in Sikkim – 520 MW Teesta IV and 66 MW Rangeet II. On April 20 it conducted a field visit to the site of the proposed 520 MW Teesta IV project. On April 21 it will meet in the NHPC Conference Room in Singtam for its monthly meeting which usually takes place in New Delhi. On the Agenda is a discussion on the 'Scoping' of the 520 MW Teesta IV project, appraisal for environmental clearance of the 66 MW Rangeet II project and a discussion on river water flow.

What exactly is 'Scoping' mentioned above with respect to the 520 MW Teesta IV project? Under the Environment Impact Assessment (EIA) Notification 2006, development projects and activities which require environmental clearance are categorized as Category A and B. Category A projects are evaluated for environmental clearance by the MoEF in New Delhi and Category B projects by a State Environment Impact Assessment Authority (SEIAA) constituted by the Central Government at the state level. As far as hydroelectric projects are concerned, projects greater than or equal to 50 MW are Category A projects. Projects which are greater than or equal to 25 MW and less than 50 MW are Category B projects. Category A projects (such as Teesta IV and Rangeet II) need to go through a 3 stage process for environmental clearance – Scoping, Public Consultation and Appraisal. 'Scoping' stage is the first stage evaluation of the project wherein the EAC may give detailed Terms of Reference (ToR) for conduct of EIA studies for the project and a clearance for pre-construction activities such as conduct of various investigations and studies. However, if the site is felt to be inappropriate on environmental

and social grounds, the MoEF based on recommendations of the EAC can reject the project at this stage itself. The EAC may choose to conduct a site visit in order to give its recommendations, which is what the EAC on River Valley & Hydroelectric projects has done for the 520 MW Teesta IV project on April 20. They will now meet today to discuss the future of the Teesta IV project.

The ongoing marathon protests of the Affected Citizens of Teesta (ACT) have highlighted many socio-cultural and environmental concerns associated with the development of a juggernaut of mega dams in the state in general and Dzongu in particular. With Gangtok's ambitious plans to harness the hydroelectric potential of the Teesta river basin through a mega plumbing exercise involving a maze of dams and tunnels criss-crossing the entire state's landscape (see map), the question which comes to one's mind is: Will the Teesta be allowed to flow free in any stretch of the river at all? For a while let's keep aside many tributaries and focus on the main stem of the Teesta river, formed after the Lachung Chu and Lachen Chu join near Chungthang. At least four consecutive mega hydroelectric projects are planned on the main Teesta in Sikkim in the stretch from Chungthang to where the river enters North Bengal. These are the 1200 MW Teesta III, 520 MW Teesta IV, 510 MW Teesta V and 500 MW Teesta VI. All these so called 'run-of-the-river' hydroelectric projects involve the construction of large dams which divert the river waters through long tunnels, before the water is dropped back into the river at a downstream location after passing through a powerhouse. The long tunnels ensure that long stretches of the river are bypassed for each project, for example 23 km. of river is bypassed for already commissioned Teesta V project. In the winter months 85-90% of the river flow will be diverted through the tunnels. Throughout the year, the river will be in full flow only in very brief stretches between two consecutive hydropower projects. The MoEF based on the recommendations of the EAC has already granted environmental clearance to three out of the four projects referred to above in the past – 1200 MW Teesta III, 510 MW Teesta V and 500 MW Teesta VI. Teesta III & VI are under construction while Teesta V is already commissioned.

The three under construction or commissioned projects (Teesta III, Teesta V, and Teesta VI) will directly impact at least 71 km. of main Teesta river. This includes 63 km. due to bypassed stretches of the river in which

the flow will be minimal and at least 7.6 km being the cumulative length of the reservoirs in the main Teesta river (not including the reservoir length along some of the tributaries). If the Teesta IV project is allowed to come up, an additional 12.12 km (7.75 km bypassed stretch of the river and 4.37 km being length of the reservoir), the last free stretch of the main Teesta river in the upper reaches, will be destroyed. Totally around 83 km of the river will be directly (and seriously) impacted in Sikkim. The only stretch of the river which will be able to flow free is downstream of the Teesta VI project, a major portion of which flows along the Sikkim – West Bengal border. It is absolutely important that the last remaining stretch of the main Teesta river in its upper reaches in Sikkim (between the Teesta III and Teesta V projects) is allowed to flow unfettered to respect both the ecological and cultural heritage of a river which is closely associated with the identity of Sikkim. The only way this can happen is if the Teesta IV project is scrapped. Counter arguments are being made that a little over 20% of the lean season flow will be there in the bypassed stretch of the Teesta IV project (between dam and powerhouse) due to releases from the dam and incremental additions by other tributaries. But when the ecological integrity of the main Teesta river has already been compromised to such a large extent in Sikkim by the three existing mega projects, we need to allow full (100%) flow at least in this stretch of the river between Teesta III and Teesta V.

It is to be seen if the EAC will allow the last remaining stretch of the main Teesta river in Sikkim between the Teesta III and Teesta V project to flow free. It does not require the conduct of further impact assessment studies to realise that the coming of the Teesta IV project will be the final nail in the coffin of the main Teesta river in Sikkim, since the other three mega projects mentioned above are already commissioned or under development. The Teesta IV project should, therefore, be scrapped at the 'Scoping' stage itself, because of the above mentioned reasons. It is certainly not unreasonable for citizens of the state and rest of the country to expect that at least some stretches of the main Teesta river in Sikkim are allowed to flow free.

There are many diverse issues associated with the pending decision on Teesta IV, but for the sake of this piece I have focused on one of the key issues: Can the Teesta be allowed to flow free in at least the stretch of the river between Teesta III & V? ACT has led a remarkable struggle to



raise these issues until now. But it is time for other citizens of the state to answer a question about a river so closely associated with the identity of Sikkim: Are we going to simply watch as the last nail is hammered into the river's coffin?

*—The author is a member of Kalpavriksh, an environmental action group.*

Courtesy: Sikkim Express,

April 21, 2009

<http://www.sikkimexpress.com/topstories.htm>

# TEESTA'S TEARS

**Dionne Bunsha**



*At the venue of the relay fast that has continued in Gangtok since June 2007. The Affected Citizens of Teesta comprises students, professionals and former politicians*

DAWA LEPCHA has a tube stuck up his nose. It goes right down to his stomach. Sometimes, while he is asleep, it moves and chokes him. But the tube is his only sustenance. The juices poured through it are the only nourishment that keeps him alive.

Dawa Lepcha has been on a fast since March 10. Last year he fasted for 63 days. He and his friends are protesting against the dams on the river Teesta in Dzongu in north Sikkim, the home of the Lepchas, Sikkim's earliest inhabitants. These young men are in hospital, starving to make sure their tribe survives.

## **Tunnelling the Teesta**

"The entire Teesta river is being tunnelled. The main river of Sikkim is disappearing underground. Is this development?" asks Dawa Lepcha. "Sikkim is a very small State, but very rich in biodiversity. If they are allowed to go ahead with the hydel projects, they will ravage, plunder and destroy everything."

The Sikkim government has discovered that there is money to be made from hydel power. It has proposed around 26 dams across the state. Of these, seven projects are in Dzongu. It is part of the Central government's master vision of the north-eastern region as "India's Future Power House", with around 168 dams planned. The projects are being cleared at any cost. Recently, Union Minister of State for Power Jairam Ramesh said at a press conference in Guwahati: "I want to check this MoU [memorandum of understanding] virus in the north-east." Laws have been flouted to grant clearances. Environmental protection has taken a backseat.



*The power house of the Teesta Phase 5 project*

"They plan to build four dams inside the Khangchendzonga National Park, two inside the Khangchendzonga Biosphere Reserve and two on the border of the reserve. Most of Dzongu falls in the Khangchendzonga Biosphere Reserve. The biodiversity of the entire region is at stake," says Dawa Lepcha. "We Lepchas are nature-worshippers. Many of our holy lakes and springs are in Dzongu. We cannot let our sacred land be destroyed."

### **People of the ravine**

Lepchas are the indigenous people of Sikkim, but they constitute less than 7 per cent of its population. They call themselves rong-kup (people of the ravine). Over the past two centuries, Nepali migrants have outnumbered the Lepchas in their homeland. The Lepchas are now a minority, a dying race. The Lepcha population is now 40,000, of which around 7,000 live in Dzongu, near the magnificent Khangchendzonga, the third highest mountain peak in the world.

Dzongu, the holy land of the Lepchas, was a protected area even when Sikkim was an independent kingdom (Sikkim merged with the Union of India in 1975). Any outsider, even a Lepcha living outside Dzongu, has to apply for a permit to enter it. Only Lepchas from Dzongu can own land here. This was done to protect the sacred land, the dying community and its culture.

“By building seven dams in the Lepcha-protected area, and allowing such a large influx of migrant labour, the government is violating its own laws. There are only 7,000 Lepchas in Dzongu. With just one project, we will be outnumbered. Our culture is under threat,” says Dawa Lepcha.

Sitting on the hospital bed across Dawa Lepcha is Onchuk Lepcha. He has left his village Tingvong and come to Gangtok to join the Affected Citizens of Teesta (ACT) hunger strike. “If the land is taken by industrialists, we will be refugees in our own land. It hurts us to see Dzongu being destroyed,” says Onchuk Lepcha.

The ACT comprises students, professionals and former politicians who have come together to save the Teesta basin. It has not only Lepchas, but also members from the Bhutia community (Tibetans who migrated here several centuries ago) and environmental groups.

## Pro-dam movement

To counter the ACT, politicians who want to see the project go through have started a pro-dam movement. They are organising rallies and have submitted a petition to the government asking for the dam projects to be implemented immediately.

“Sikkim has the potential to generate 8,000 MW of power. We will get 12 per cent of the revenue from these projects. In every development project, there will be some minor destruction, but it’s not much,” says Sonam Gecho Lepcha, a Member of the Legislative Assembly from Dzongu, who is leading the pro-dam lobby. He was earlier part of the anti-dam movement and promised to stop the dams during his election campaign. “No doubt, there is some apprehension in my constituency, but the majority of people are in favour of the project. Why else would our party win in the local elections?”

Politicians are using their clout to beat the locals into submission, allege ACT activists. “The MLAs are pressuring people to give their consent

to the dams. Even my father was with them earlier. But now I have convinced him about how much damage the dams will do. Most of the politicians and big land owners want the dam, so that they can make money," says Onchuk Lepcha. "People in our villages are innocent. They don't understand the value of our land. Others can take advantage of them. That's why the educated Lepcha youth are fighting. We know the dangers," Onchuk Lepcha explains.

The dams will channel water through tunnels into an underground powerhouse. Sikkim's Chief Minister Pawan Kumar Chamling claims to be a "green C.M.". He claims that run-of-the river projects such as the Teesta dams involve smaller submergence of land as compared to storage dams, and hence cause less damage.

However, construction of the Teesta Phase 5 project, the only dam which is almost complete, has proved otherwise. "The blasting of rocks to build the tunnels has resulted in drying up of water sources and landslides in villages near its 23-km-long stretch. A lot of mud and debris has been dumped along the river banks," says Dawa Lepcha.

## Dry streams

Close to the power house of Teesta Phase 5, we met Jung Bahadur Chetri, 70, from Singbel village. Though the state did not acquire his land for the dam, it has made him homeless. "Owing to the blasting, there are so many cracks in my house that it is not in a condition to live in. There are 20 of us in my family. We had to move to another person's house during the monsoon," says Chetri. "What's even worse is that our farms are destroyed, because the streams have dried up. We used to sell fruits and vegetables in the market. Now, there's none for us to eat. The four District Collectors and the MLAs have come and gone, but no one has listened to us."

Ever since the dam was constructed, Bhim Prasad Nepal had to give up farming and work as a labourer at a quarry. "This dam has destroyed Sikkim. Water used to spring out of the earth here. Now, it's all gone – the trees, the farms, the grass. All the villages are hungry," says Bhim Prasad. "This is the mango season. But there is no fruit. The flowers dry up because there is no water below."

In Ralap 5 Mile, on the banks of the river, women complained that their homes were sinking. They have to walk several kilometres uphill in

## HYDEL PROJECTS IN SIKKIM



Name of project	Capacity (MW)	Name of project	Capacity (MW)
1. Teesta stage-I HEP	280	16. Rangit-II HEP	60
2. Teesta stage-II HEP	330	17. Rangit-IV HEP	120
3. Teesta stage-III HEP	1,200	18. Dikchu HEP	96
4. Teesta stage-IV HEP	495	19. Jorethang Loop HEP	96
5. Teesta stage-VI HEP	500	20. Lingza HEP	120
6. Lachen HEP	210	21. Thangchu HEP	40
7. Panan HEP	300	22. Bhimkyong HEP	99
8. Rangyong HEP	117	23. Bop HEP	90
9. Rongni Chu HEP	96	24. Ting Ting HEP	70
10. Sada Mangder HEP	71	25. Ratey chu-bakcha chu HEP	40
11. Chuzachen HEP	99	26. Teesta stage-V	510
12. Bhasmey HEP	32	27. Tashiding HEP	60
13. Rolep HEP	36	28. Suntaley Iar HEP	30
14. Chakung Chu HEP	50	29. Rangit III HEP	60
15. Ralang HEP	40		

Source: Energy & Power Department, Government of Sikkim

search of water after the streams have dried up. "If you ask for even a glass of water now, it's difficult for people to get. People say that this dam is for our development. But we haven't got anything from it, not even a single job. Just misery," says Leila Chetri, a housewife.

The environmental clearance for Teesta 5 was given in May 1999 on the condition that "no other project in Sikkim will be considered for environmental clearance till the carrying capacity study of the Teesta basin is completed". However, the Ministry of Environment and Forest (MoEF) violated its own condition, and cleared six projects even before the final carrying capacity study was submitted in August 2007.

## **Floods and landslides**

It is a wonder how the MoEF cleared the dam projects after reading the carrying capacity report. The report recommends that there should be no large-scale development in the geologically sensitive and biodiversity-rich regions of north Sikkim, because there is the danger of glacial lake outburst, floods, massive landslides and flash floods.

The report says that dam-building activities should not be carried out upstream of Chungthang, a town situated at the confluence of the Lachen and the Lachung Chu, tributaries of the Teesta, which is the starting point of the river. It is also a town imbued with Buddhist legend. Guru Padmasambhava, the revered founder of Tantric Buddhism in Tibet, is said to have rested here and left his footprint on a rock. There are seven projects planned north of Chungthang.

Considering that the Teesta basin is in an earthquake-prone area, the report also recommends more surveillance of seismic activity. It recommends small-scale projects south of Chungthang, rather than large projects. The report also warns that the views of local communities should not be undermined or neglected.

Besides warning about the dangers of dams, the carrying capacity report also focusses on local development measures such as reviving agriculture, organic farming and minor irrigation projects, infrastructure for floriculture, improving schools and healthcare facilities, protecting biodiversity and endemic species, and restricting commercial taxis.

Although scientists have warned about the dangers of the dams, the Sikkim government insists that they are harmless. "It is the most eco-

friendly project. There is no pollution, only a little during the construction,” says an official from the Sikkim Energy and Power Ministry. “We have got all the environmental clearances from the Central government. These are not big dams, just small diversion dams. They are not within the Khangchendzonga National Park.” When asked if dams are dangerous in a seismically sensitive zone, the official said, “The entire Himalaya is a sensitive zone, but the Central government has planned hundreds of dams across the mountain ranges, not only in Sikkim. No one can prove that people’s homes were damaged owing to the blasting. It could be for other reasons such as earthquakes or landslides.”



*Jung Bahadur Chetri from Singbel village. Chetri's farm and house were affected by the blasting of rocks to build tunnels. His house has developed cracks and the streams that fed his farm are now dry*

## Ignoring scientific studies

Though the Sikkim government's newly formed Glacier & Climate Change Commission has initiated scientific studies on its melting glaciers, it has not factored in the effects that receding glaciers would have on the dams. “There’s no way the melting glaciers will affect the dam. Even if glacier water is not there, rainwater will feed the rivers,” says an official. His opinion contradicts international scientific opinion, which has warned of short-term flooding and the eventual drying of rivers owing to melting glaciers.

Local people have consented to the project, the official claimed. “All landholders have given up their land for the Teesta projects without any objection. We have acquired 40 hectares of land. There was no force. They



willingly took the money," he said. "We are willing to address the concerns raised by the ACT by ensuring that workers who work on the project live in colonies outside the Lepcha area, so that they are not affected."

When asked if the damage outweighs the benefits, he said, "We will get 12 per cent of the power, which we can use or sell for revenue. We need electricity. If people don't want it, why are they sending their children to schools and colleges in the cities?"

But it is the students who are at the forefront of the ACT protest. The tunnels being built under the Teesta could kill the river basin. That is why these youth are risking their lives. They say they would rather choke on the tubes, than let the tunnels destroy their sacred land.

<http://www.hinduonnet.com/fline/fl2512/stories/20080620251209500.htm>

## DAM BUILDING IN SIKKIM HIMALAYA AND VIOLATION OF FRA 2006

**T**he Human Rights Law Network organised an Independent People's Tribunal on Dams, Environment and Displacement on 22 and 23 January 2011, at Singtam. During the Tribunal, several dam-affected people came forward to narrate their grievances against various hydel projects, like Teesta Stage IV, Teesta Stage V by NHPC Company Ltd. Rangeet Hydel Project II by Gammon India Hydel Power Project and Panan Project by Himagiri Hydro-Energy Private Limited. Relevant portions of the concept paper as aforesaid run as under:

### **Introduction of the state and its natural resources**

Sikkim is one of the small category states of India merged in the Indian Union in 1974.<sup>1</sup> The state is located approximate 27 Degree North latitude and 88 Degree East longitude. State has total area of 7096 sq km. Gangtok is its capital. There are 440 villages, eight towns and four districts: East, West, North and South. The state has five major ethnic groups, namely – Lepchas, Bhutias, Nepalis, Sherpas and Tawangas. The climate of the state varies from cold temperate and alpine in northeast to subtropical in the south. Climate is tropical, temperate and alpine. In the west, it has mountain Khangchendzonga (peak height is 28156 ft), the second highest peak of Himalaya and Mt Kabru at 24215 ft. Agro-climatically, the state is divided into four zones, viz.:



\* Subtropical zone (below 1,000 metres);

\* Humid zone (1,000-1,600 metres);

\* Mid-hill dry zone (again in altitude ranging from 1,000-1,600 meters); and

\* High hill temperate zone (with an altitude of above 1,600 meters).

## Natural resources

The state is gifted with abundant natural resources. The resources can be grouped into biotic or abiotic, both of which can be renewable and non-renewable. Biotic resources include – agricultural crops, fodder and forests. The entire Himalayan region is endowed with natural flora and fauna, and is a paradise for nature-lovers, conservationists, botanists, zoologists and environmentalists. There are about 4500 species of flowering plants, 600 plant species divided by 362 species of ferns and its allies, 11 species of oaks, nine species of tree ferns, 30 species of primulas and 20 species of bamboos. Many medicinal plants are found in low and high altitude areas. Another major resource is water. The potential of microbial diversity in Sikkim has not yet been tapped, except from foods such as traditional fermented foods and beverages. Glacial micro-flora and that from aquatic ecosystems, forests, soils, plants, fungi etc., are yet to be documented. In fauna, the state is also very rich, around 150 species of mammals, 550 species of birds, over 600 species of butterflies and many more of moths. Many species of reptiles and amphibians are available. Human

and livestock resources, hydro-electric potential, tourism, agriculture and horticulture etc., add to Sikkim's natural resources. In forests, non-wood forest produce has a vast potential like sand, boulders, and other materials. Under economic geology, the minerals like copper, iron, lime, dolomite/limestone, coal, quartzite, talc, silicate and graphite are available in the state. Garnet is abundant in the gneiss and mica schist at places. Large cardamom production is very high in the state. There is vast potential for hydro-electric power generation. Tourism development deserves consideration to add to the economy of the region. Forestry is the major land use in the state and nearly 80% of the total geographical area of the state is under the administrative control of the forest department. The forested area of the state is 3129 sq. km., which is 44% of the total geographical area. This figure is one of the largest in the country. There is one high altitude National park (cum-Biosphere Reserve) and six wildlife sanctuaries, which together constitute over 30% of the total geographical area of the state. Covering just 0.2% of the geographical area, Sikkim Himalaya shows tremendous biological diversity.<sup>2</sup>

The Government of Sikkim has issued a notification dated 28.1.2008 regarding constitution of an Expert Committee for identification of Critical Wildlife habitats in Protected Areas (PAs).

Major area of the state is covered by forest. Due to mountainous terrain and steep slopes, major part of the state is unsuitable for agricultural operation. The types of land used under other operations are barren and not suitable for cultivation. Only about 11% of land is under operational holdings and about 28.64% of the total area of the state is barren and uncultivable.

A very small part of land (9.58 %) is used for non-agriculture purposes. Permanent pastures and grazing lands and cultivable wastelands together cover 14.04% of the total area of Sikkim. In Sikkim, per capita cultivated land is 0.32 ha, which indicates low availability of cultivated land in Sikkim. In North District, per capita cropland is 0.28 ha.<sup>3</sup>

People affected by **Teesta Stage IV and Panan Hydel Project** expressed their grievance against this project:

### Teesta Stage-IV

Mr. Tenzing Lepcha, s/o Nethup Lepcha, Hee Gyathang, 28 yrs, Lower Dzongu,

Mr. Ongyal Dindong s/o Lhazang Lepcha, 30 yrs, Lower Dzongu.



1) (Testimony 11) Tenzing Lepcha, s/o Nathup Lepcha, age 28 years, 12 family members from Hee Gyathang, Lower Dzongu. He owns nine hectares of land and runs a tourism business. Five hundred twenty megawatt Power Project Stage IV by NHPC at Dikchu established an office at Dzongu for rock-testing and planned to construct a 15 kms. long tunnel under this village. As a result, several problems cropped up like (a) the groundwater level went down resulting in dry condition of the subsoil, which in turn affects the productivity of crops and drinking water supply; (b) vast tracts of agricultural land submerged and lost for dam construction; (c) many residential houses badly damaged and now are dangerous to live in; (d) there is a sacred lake, and a very rare fish called "Dangdolit" found only here will be extinct. This fish is religiously very important to the Lepchas and there is a belief that their existence is related with this fish species; (e) the entire Dzongu area is preserved for Lepchas and considered sacred by the local people. Therefore, to undertake any activity in

this region would require the consent of these people. Community members have been protesting since the public hearing in 1997, but they were arrested and continuously harassed by the administration.



2. (Testimony 12) Ongyal Lepcha, s/o Lihazang Lepcha, 30 years of age, 13 family members from Lingdong village of Lower Dzongu. He owns five hectares of cultivable land. The Hydel Power Project Stage IV, 520 megawatt generation capacity by NHPC constructed a Dam at Dikchu. The River Teesta will pass through a 15 kms. long tunnel. This will cause a 15 kms stretch of the River dry up, which would lead to loss of fish and other fauna. The water of River Teesta is essential for marriage ceremony in Lepcha clan. Thus, the project would also affect the marriage rituals of the clan. Noted that no public hearing has been conducted by the NHPC for this project.

### **Panan Project**

1. Mr. Tashi Namgyal Lepcha, s/o Nak Lepcha, 35 yrs, Dzongu,
2. Mr. Gyatso Lepcha, s/o Kunzang Lepcha Passingdang, 31 yrs, Dzongu, and
3. Mr. Dawa Lepcha.



3. (Testimony 9) Tashi Namgyal Lepcha, 35 years of age, s/o Nak Lepcha and four members in his family from Dzongu. He is a farmer and owns five hectares of land. Panan Hydel Project by Himagiri Company has started a 280 MW powerhouse and 8-9 kms. long tunnel in Dzongu. This tunnel will pass under five villages, and there are 45-50 houses above the powerhouse. Around 80 hectares of land has already been acquired by the company at a very low price (Rs.14/sq. ft.) and only 45-50 families among about 100 affected families received the compensation which is almost half of the number of total affected family. During construction, continuous blasting and drilling in the mountains caused all the wild animals disappear from the nearby forest called Samfyuk Lho. Water sources dried up and the groundwater level went down resulting in dry condition of the subsoil, which affected the productivity of crops and drinking water supply. Their house might have damaged due to construction, and all the villagers are worried for their survival.

4. (Testimony 10) Gyatso Lepcha, s/o Kunzang Lepcha, age 31 years, seven family members from Passingdang village, Dzongu. He owns nine hectares of land and runs a small family business. Panan Hydel Project by Himagiri Company has started a 280 MW powerhouse. This hydro-electric project is planned in the Rangyong Chu River which is a holy river and religiously very important for the Lepchas. This river will be

flowing underground through tunnels for long distances, leaving 15 kms. stretches of the river course with little or no water. The Lepcha clans are identified by the mountains, rocks, springs and streams in Dzongu. This is their holy land. Moreover, there are 12 monasteries in Dzongu which are threatened with submergence. Panan Project will affect the most populated part of Dzongu and the most productive part consisting of not only the homestead land, but cultivated land and land under cardamom plantation, the cash crop of North Sikkim.

### **Dikchu, Chumthang and Dzongu, the Lepcha Reserve and violations of Forest Rights Act, 2006**

Some of the relevant sections in the *Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*, in this context are as following:

According to the Forest Rights Act, forests traditionally used by forest-dwellers will be treated as community property, whose management and conservation authority will be the communities:

*1.2. In this Act, unless the context otherwise requires,-*





(a) "community forest resource" means customary common forest land within the traditional or customary boundaries of the village, or seasonal use of landscape in the case of pastoral communities, including reserved forests, protected forests and protected areas, such as Sanctuaries and National Parks to which the community had traditional access;

**NOTE: This Section in effect says that forestlands traditionally used by communities would be treated as community forest resource. It does not matter whether the land falls within government forests like reserved or protected forests, and even wildlife areas like sanctuaries and national parks, from now onwards all the victims from project area can claim that forest areas near or around their villages are community forests.**

(c) "forest dwelling Scheduled Tribes" means the members or community of the Scheduled Tribes who primarily reside in and who depend on the forests and forest lands for bona fide livelihood needs and includes the Scheduled Tribe pastoralist communities.

**NOTE: WHO CAN CLAIM RIGHTS UNDER THIS ACT? Only those Scheduled tribes who live 'primarily' in forests, and who depend upon 'forest land or forests for bona fide livelihood needs' can claim that they are 'forest-dwelling STs.'**

**'Primarily live in' should be interpreted to mean, people associated with forests for sustenance and 'bonafide livelihood needs' has been explained in the Rule (2b):**

*"bonafide livelihood needs" means fulfilment of sustenance needs of self and family through production or sale of produce resulting from self-cultivation of forest land as provided under Clauses (a), (c) and (d) of Sub-section (1) of Section 3 of the Act;*

(d) "forest land" means land of any description falling within any forest area and includes unclassified forests, undemarcated forests, existing or deemed forests, protected forests, reserved forests, sanctuaries and national parks;

**NOTE: This is a broad definition. Forest-dwellers can claim that any land in or around forest areas is forest land. This definition includes all kinds of land, including private estates and disputed lands, and as long as government can not produce records showing that the land is non-forest (Recorded Agricultural Land, Pastures or Gowchars, Orchards or Estates, etc). Even then, it can be claimed that the area**

**contained a forest once, if it is on the fringe of a forest. This is important because the claimants must primarily live in forests, and this definition makes 'forestland' a much broader concept, than just land shown in government records as 'forests'.**

*(e) "forest rights" means the forest rights referred to in Section 3;*

*(f) "forest villages" means the settlements which have been established inside the forests by the forest department of any state government for forestry operations or which were converted into forest villages through the forest reservation process and includes forest settlement villages, fixed demand holdings, all types of taungya settlements, by whatever name called, for such villages and includes lands for cultivation and other uses, permitted by the government;*

*(h) "habitat" includes the area comprising the customary habitat and such other habitats in reserved forests and protected forests of Primitive Tribal Groups and pre-agricultural communities and other forest dwelling Scheduled Tribes ;*



**NOTE: The term "habitat" applies only to pre-agricultural and primitive tribal groups. Under the act, "Primitive Tribal Groups" (such as the Juangs, the Chenchus, the Baigas etc.) and "pre-agricultural communities" (such as, Jhoomiyas/shifting cultivators) have the right to**

**“habitat and habitation.” [Section 3(e)]. “Habitat” here is defined to mean the traditional area in which these communities have lived, even if that should be inside reserved / protected forests.**

**We should see *right to a habitat*, as:**

**The right to remain inside these forest areas and not be evicted;**

**The right to prevent these forests from being destroyed (since that would leave these communities without a habitat);**

**The right to continue cultural and social activities in these forest areas that made them into a “habitat.”**

*3. (i) right to protect, regenerate, or conserve or manage any community forest resource...*

The community rights in such forests include grazing, fishing, NTFP collection (inclusive of processing and sale) and cultivation:

*3.(c) right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries;*

*3. (d) other community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastoralist communities;*

It was clearly stated in the Act that in case of people exercising their rights, this Act will take precedence if it conflicts with any other Act:

There is no concept of villages in Sikkim. The Survey was done by Survey of India. In 1952, proper land survey was done. Next survey was done in 1978-79. There were irregularities in recording four types of forests: i) Reserve Forest, ii) Khasmahal Forest for local timber needs and iii) Gaucharan Forests Grasslands or grazings areas, and iv) Private Monastery Forests are owned by the villages. Notification was done in 1905 and in 1909 Forest Department was established. Before that it was under the control of Thekedars (contractors). They had rights to mortgage the land or not is not clear. The 1909 Declaration of Forests that all forest is under the state. In 1945, the Thekedari system was abolished and ten years later in 1955 was established IFA. After 1978, there are no fluctuations in the boundary. They notified to protect the forest and banned grazing in 165 villages, 891 woods in five-six wards divided every village. There are BDOs and 27 Assistant Conservators of forests. About 1.84% of the area

is forest, hence there are tribals and ***Other Traditional Forest Dwellers (OTFDs) in the area***, contrary to what the state administration is saying that they are not there. Both documentary and oral evidences exist to this effect.

The FRA process has not been started, in fact, it has not proceeded beyond the initial stages, for various reasons. ***It is, therefore, incorrect and misleading for the district administration to conclude that there are no OTFDs "in cultivating possession of the land since three generations" in the area.*** Firstly, this cannot be concluded without having gone through the process of claims; secondly, the FRA provides for dependence on forest land also as criteria for eligibility, not only "cultivation possession of land." These rights can be exercised in all types of forest land:

As per their understanding, no tribal is living in the forest area. Khasmahal is community forests. The Sikkim Government admitted to the MOEF Committee during the visit in September 2010 that almost no action has been taken under Sections 3(1) (b to m). The Chief Secretary admitted that there was not much study of the Act has been done.<sup>4</sup>

*4. (1) Notwithstanding anything contained in any other law for the time being in force, and subject to the provisions of this Act, the central government hereby recognises and vests forest rights in-*

## Chapter II

### FOREST RIGHTS

*3. For the purposes of this Act, the following rights which are secure individual or community tenure or both, shall be the forest rights of forest dwelling Scheduled Tribes and other traditional forest dwellers on all forest lands, namely:*

**NOTE:** It is clear that all rights would be effective in all forest lands, including all kinds of wildlife areas such as, National Parks, Wildlife Sanctuaries and Biosphere Reserves. The State of Sikkim is clearly violating the FRA Act 2006 from its beginning. Several dams constructed by the private and government undertaking companies inside and buffer areas of the forest will completely destroy the ecosystem of the area. Teesta Stage III, Teesta Stage IV and Panan Hydel project in Dzongu are located within the Khangchendzonga National Park and the core zone of the Khangchendzonga Biosphere Re-

serve. A few dams have already been constructed like Rangeetnagar in the South District and the West District near Legship, Singtam, Dikchu in the East District etc. Due to dam construction, the agricultural land has been encroached upon resulting in loss of valuable and scarce cultivated land.

*(a) right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers;*

**NOTE:** It means that people can hold forestland for living and cultivation. Permanent land titles would be given on the basis of this right to all people who occupied land before 13 December 2005.

*(h) rights of settlement and conversion of all forest villages, old habitation unsurveyed villages and other villages in forest, whether recorded, notified, or not into revenue villages;*

**NOTE:** This clause is very important, because it states very clearly that all types of villages on forestland including which do not exist on government maps and those the government call 'encroached' can be converted into revenue village, as a right. This makes things easier for the movements, because in order to be converted into revenue village, the whole village would be treated as one unit, and record-making and ensuing legal process would be easier.

*(i) right to protect, regenerate, or conserve or manage any community forest resource, which they have been traditionally protecting and conserving for sustainable use;*

**NOTE:** Extremely important. Together with 3(5), and 2(a) this clause gives communities clear powers and rights to control the management of 'government forests,' like reserved or protected forests, and sanctuaries and national parks. The Gram Sabha and its members now can stop FD (and the timber mafia), or any other agency by virtue of these clauses from cutting trees or doing anything (mining, dam-building etc.) which they think can be destructive to forests, wildlife and biodiversity. The Gram Sabhas can make rules restricting entry to forest, and plant trees on blanks if required.

As per a circular by Senior Assistant Inspector General of Forests, MOEF dated 30/07/2009 says before conversion of any forest land it

**requires written NOC/Permission of the Gram Sabha concern.**

*a. A letter from the state government certifying that the complete process for identification and settlement of rights under the FRA has been carried out for the entire forest area proposed for diversion, with a record of all consultations and meetings held;*

*b. A letter from the state government certifying that proposals for such diversion (with full details of the project and its implications, in vernacular /local languages) have been placed before each Gram Sabha concerned of forest-dwellers, who are eligible under the FRA;*

*c. A letter from each of the Gram Sabha concerned, indicating that all formalities/processes under the FRA have been carried out, and that they have given their consent to the proposed diversion and the compensatory and ameliorative measures if any, having understood the purposes and details of proposed diversion.*

*d. A letter from the state government certifying that the diversion of forest land for facilities managed by the government as required under Section 3(2) of the FRA has been completed and that the Gram Sabhas have consented to it.*

*e. A letter from the state government certifying that discussions and decisions on such proposals had taken place only when there was a quorum of minimum 50% of members of the Gram Sabha present;*

*f. Obtaining the written consent or rejection of the Gram Sabha to the proposal.*

*g. A letter from the state government certifying that the rights of Primitive Tribal Groups and Pre-Agricultural Communities, where applicable, have been specifically safeguarded as per Section 3(1)(e) of the FRA.*

*h. Any other aspect having bearing on operationalisation of the FRA. The State/UT governments, where process of settlement of Rights under the FRA is yet to begin, are required to enclose evidences supporting that settlement of rights under FRA, 2006 will be initiated and completed before the final approval for proposals.*

**As mentioned earlier, the government officials admitted to the MOEF Committee that almost no action has been taken under Sections 3(1) (b to m).**

**These clauses also make FD-sponsored JFM/CFM committees totally redundant, because the Act makes the Gram Sabha responsible for forest protection and management.**

*(j) rights which are recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribals under any traditional or customary law of tribes concerned of any State;*



**NOTE: All these rights would be in addition to rights provided by this Act.**

*(k) right of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity;*

*(l) any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be, which are not mentioned in Clauses (a) to (k).*

**NOTE: Dzongu, the ancestral homeland of the Lepcha community is a protected tribal reserve of 7,000 people, located in North Sikkim close to the base of Mt. Khangchendzonga.**

**Dzongu is protected by a special provision under Article 371(F) of the Indian Constitution. No outsider can reside within and own land in Dzongu, nor the land within Dzongu can be transferred.**

The Panan Power Project is at the heart of Dzongu on the Rangyang Chu River is equal in religious significance to the River Gangas for Hindus. During the marriage ceremony, holy water of Teesta River is sprinkled on the couple. There is a sacred lake, and a very rare fish called "Dangdolit" found only here, will be extinct. This fish is religiously very important to the Lepchas and there is belief that their existence is related with this fish species. The powerhouse is located near the holy spot of Namprikdam, where all the Lepcha festivals are held. That same site also hosts the powerhouse of Teesta III. The Panan, Teesta III and Teesta IV will affect the River and most populated part of Dzongu and the most productive part consisting of not only the homestead land, but cultivated land and land under cardamom plantation, the cash crop of north Sikkim.

The proposed project lies in the Dzongu area considered sacred by the local people. Therefore, to undertake any activity in this region, it would require the consent of these people.<sup>5</sup>

## Section 5, Duties of holders of forest rights

*The holders of any forest right, Gram Sabha and village level institutions in areas here are holders of any forest right under this Act are empowered to-*

- i ) Protect the wildlife, forest and biodiversity;*
- ii) Ensure that adjoining catchments area, water sources and other ecological sensitive areas adequately protected;*
- iii) Ensure that the habitat of forest dwelling Scheduled Tribes and other traditional forest dwellers is preserved from any form of destructive practices affecting their cultural and natural heritage;*
- iv) Ensure that the decisions taken in the Gram Sabha to regulate access to community forest resources and stop any activity which adversely affects the wild animals, forest and the biodiversity are complied with;*

**Section 5 clearly defines the responsibilities of the Gram Sabha members which is applicable for the Lepcha community. Panan Hydel Project and Teesta Stage IV fall within Khangchendzonga Biosphere Reserve. It was notified in February 2000. It is spread over North and West districts encompassing 1784 sq. km. of Khangchendzonga National Park and 835.92 sq. km. over four buffer zones totalling an**



area of 2619.92 sq. km. These buffer zones are Lhonak Valley, West Chungthang-Lachen, Tholung Valley and Rangeet and Teesta Catchments.

Stage-III and Stage-IV harbour rich diversity of mammalian and bird fauna in addition to being a zone of diversity of butterflies. About 345 species of butterflies are found in the vicinity. Therefore, any increased human activity in this critical zone would have adverse impact on the habitats of these species. Further, no poundage of any duration should be allowed in this area which would lead to geological instability resulting in the increased incidence of landslides.

According to the CISMHE report (p 166), "More than 60% (of the total in Sikkim) of the endemic (flowering plants) species are located in North Sikkim only. Similarly, maximum (27 out of 53 in Sikkim) number of flowing plants categorised as threatened are found in North Sikkim only." This conclusion should be qualified with a note that the CISMHE did not study most of the Dzongu area in North Sikkim.

The density, diversity and majority of pollution – intolerant species show a good health of river water. However, very few pollution – tolerant species were also recorded from this stretch of the river.

There would be major reduction in water discharge from about 10 km. river stretch, which would lead to loss of fish fauna.

Most of the captured fishery depends on the snow trout and catli while cultural fishery is nil in the vicinity.

More than 100 species of mammals are found in the vicinity of the project. The mammalian fauna is dominated by the bats and rats species. A total of eight species viz. Leopard, Wolf, Marbled Cat, Fishing Cat, Golden Cat, Clawless Otter etc., are considered as threatened species.

The Red Panda, a Schedule I animal, inhabiting the Khangchendzonga Biosphere Reserve is the most threatened species in Sikkim today. About seven species have been placed in the Schedule-I, while 19 in Schedule-II. A large number of species (37) belong to Schedule-V.

About 230 species of birds are found in the vicinity of proposed project.

**Except Crested goshawk and Hodgson's Frogmouth, all species have been categorised in Schedule-1. Former species belong to Schedule-I.**

**About 10 amphibian species and 34 reptile species inhabit the vicinity of the proposed project.<sup>6</sup>**

**Lepchas are primitive community living in the area from decades where NHPC and other Companies have been constructing dams. The Lepchas have every right to protect their land, water resources and other ecological sensitive areas. They are empowered to protect their habitat from any kind of destructive practices affecting cultural heritage (as mentioned by Ongyal Lepcha, "*The water of River Teesta is essential for marriage ceremony in Lepcha clan.*").**

## RECOMMENDATIONS

- 1) Convene Gram Sabha at project affected areas through the local panchayat,
- 2) Take resolutions against forest destruction and other environmental-ly and socio-culturally distress activity invoking powers given to the Gram Sabha under Section V of the FRA,
- 3) Communicate the resolutions to appropriate government agencies,
- 4) Issue legal notices to the government and project authorities for violating FRA.

**NOTE: The Gram Sabha consist of all adult members of the traditional village and two third quorum will be necessary.**

1. MOEF Committee Report on Sikkim,
2. weepingsikkim.blogspot.com,
3. Carrying capacity Study Report,
4. MOEF Committee Report on Sikkim,
5. Mega Hydro-power Projects in Teesta River Basin: Concerns & Struggles of ACT,
6. Pg 210-215, CISMHE Study, Executive Summary & Recommendations.

# NOTES

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## Independent People's Tribunal

The Independent People's Tribunal on Environment and Human Rights was formed on June 5, 1993 to conduct fair and credible investigations. Positioned as an alternative People's Court, it gives voice to the struggles of grassroots organisations and affected peoples. IPT works through a large network of judges, experts, lawyers, human rights activists and NGOs. IPT helps local movements bring their issues to national and international attention. It has strengthened the processes of local governance, democracy and has highlighted human rights and environmental violations by both State and private parties. The IPT reports have met with success in obtaining redressal of grievances and changes in the State Policy.

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